AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING

CIVILIAN AND DEFENSE

In This Issue . . .

French Gas Turbine Truck · · · · High Economy Loop-Scavenged Diesel · · · · Belgian Car and Truck Show · · · · Engineering Highlights of SAE Annual Meeting · · · · New Diamond T Trucks

FEBRUARY 15, 1952

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A CHILTON PUBLICATION

HEALD

Heald machines speed the nation's production

HERE'S precision in the making. One Heald machine helping to produce another. The Model 422 Bore-Matic shown above is precision finishing a workhead housing for a Heald Internal Grinding Machine. This double end setup bores two diameters, forms two radii and faces one surface on each end of the work. Diameters, concentricity and face squareness are all held to 0.0002 inches. Yes, it *takes* Heald precision to *make* Heald precision. That's one reason why your Heald machines can always be depended on for faster, easier and better production of precision finished parts.

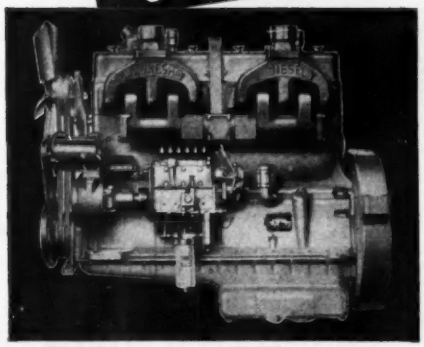
THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Branch Offices Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

...PAYLOAD POWER

WAUKESHA Diesel



WAKD Super-Duty DIESEL—6 cylinders, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displ.

● Where hauling is heaviest, and hardest . . . where turns twist, and grades are steep and stiff—Waukesha Super-Duty Diesels take trucks through, and come back for more. Waukesha has put all this payload performance into its Diesels—by 25 years of Diesel development and research—with many exclusive Waukesha features. The patented spherical combustion chamber controls combustion to meet operation needs—giving the engine lively responsive acceleration, smoothness and complete clean burning for high fuel economy and low maintenance. For the *how* and *why* Diesel details, send for Bulletin 1415.

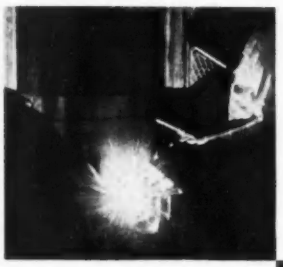
162

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • NEW YORK, TULSA, LOS ANGELES

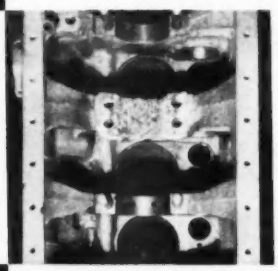
Don't scrap that crankcase

New Welding Technique
...salvages cast iron crank cases with scored bores

Scored or pinched bores used to mean the scrap pile for cast iron crank cases. But that's not so in service departments of Autocar Company branches since they installed a new salvage-by-welding technique. Here's how it's done —

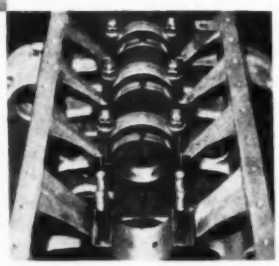


1 Welder deposits a layer of Ni-Rod "55" in center brace bore, while crank case bolted to block rests in upside-down position. This crank case bore hole had previously been machined down about .045" to remove scored area and eliminate oil-impregnated cast iron material. Fast work prevents store-up of excessive heat in cast iron brace.



2 Finished weld deposit has one-bead thickness. Using a ⅛" dia. Ni-Rod "55" electrode, the welder first deposited metal around the oil holes, then laid beads lengthwise in the bore, working from center outward and on alternating sides.

3 Now for the machining: The bearing cap is placed in a fixture. The joint surfaces are ground smooth and in parallel, then securely fastened in place. A special boring bar (bar held in perfect alignment with the other bores) and Carboloy-tipped cutting tool machine Ni-Rod "55" deposit down to the original dimensions. (Tolerance is held to 0.0005 in.)



4 As good as new. After machining, the bore's smooth new surface of weld metal is ready to receive the new bearing. Then the crank case is ready to be assembled. The first case salvaged this way has been in continuous service for over two years now, giving perfect service.

...you can save it with Ni-Rod®

There's one thing you know about increased defense production. As many broken or damaged castings as possible must be salvaged.

And with the proper techniques and equipment you can do just that.

With Ni-Rod and Ni-Rod "55", for example, you can make sound machinable welds in cast iron.

Welds that will restore equipment to essential production and at the same time save the cost of replacements.

And Ni-Rod is easy to use, too. Even a welder with limited experience can quickly learn to lay high-strength, sound, non-porous, machinable welds. Pre-heating or post-heating are seldom required.

For information on how to use Ni-Rod and Ni-Rod "55" for machinable welds in cast iron, write for your free copy of "Ni-Rod, an electrode for any cast iron welding."

And remember, defense production requires a lot of Nickel and Nickel alloys. Therefore, it may take longer to get the Ni-Rod you want. But, you can help speed delivery of your order by including the D.O. or C.M.P. rating. Consult your distributor on present availabilities; he will be glad to keep you posted. And you can call on him for technical information too.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

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INCO NI-ROD

Write today for your free copy of "Ni-Rod, an electrode for any cast iron welding."

AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

February 15, 1952 Vol. 106, No. 4

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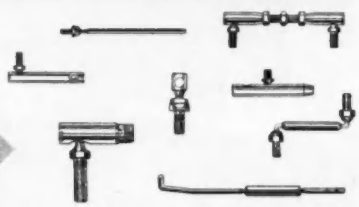
BALL JOINTS, PIPE PLUGS AND QUALITY SCREW MACHINE PRODUCTS



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Philadelphia 2

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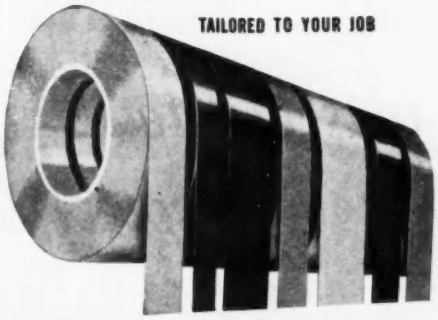
INDUSTRIAL TAPES

TAILORED TO YOUR JOB



To form a permanent butt joint, *Polyken* Tape No. 188 is vulcanized to automotive door liner and window channel material. After this, the whole product is coated with molten rubber, but the molten bath only makes the tape hold tighter.

New tape holds fast— even in bath of molten rubber

You'd think a bath of molten rubber would be about as destructive as boiling oil—especially to anything fastened together with tape.

The Schlegee Manufacturing Co. thought so when they started looking for a tape to butt-splice 100-yard lengths of woven material, which was later to be coated with hot rubber for automotive door liners and window channel stripping.

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FREE

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For specifications, samples, and further information on this and other Polyken tapes, please send me your *FREE BOOKLET*, "Tape is a Tool."

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ANOTHER NEW ROAD BUILDER

gets United Air Cleaner Protection

ALLIS-CHALMERS AD-40 MOTOR GRADER

This new, largest of all Allis-Chalmers graders, is ready for dustiest road conditions — it is protected by a United Oil Bath Air Cleaner. Even under dustiest work conditions only clean, abrasive-free air will enter the combustion chamber of the AD-40's powerful 2-cycle diesel engine. The protection furnished by the United cleaner adds hundreds of hours to the life of rings, bearings, sleeves, pistons.

Whether it's the heavy-duty AD-40 or a small portable power unit, United has an air cleaner — or can build one — to fill the bill. We invite your inquiry.

UNITED SPECIALTIES COMPANY

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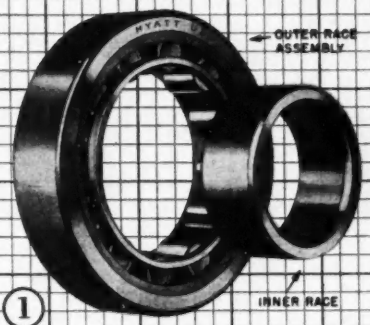
AIR CLEANERS ★ METAL STAMPINGS ★ ROLLED SHAPES
IGNITION AND TURN SIGNAL SWITCHES ★ DOVETAILS

This new Allis-Chalmers AD-40 has 104 brake hp. . . . weighs 23,000 lb. . . . can handle a 22-inch high windrow. It is equipped with the United Oil Bath Air Cleaner illustrated.

Some things you should know about HYATT HY-LOADS



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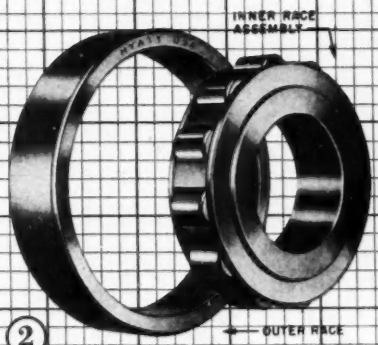

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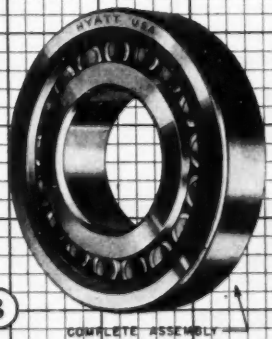


3

The Hyatt Hy-Load line of roller bearings, manufactured in three series, in a wide range of sizes and types, offers you many desirable product design and assembly advantages.

1 If design requirements are such that a larger shaft diameter is desirable to produce greater rigidity without disturbing boundary dimensions, a separable inner race type Hyatt Hy-Load bearing can be used with the inner race omitted. The rollers then operate directly on a suitably hardened and ground shaft.

2 When the housing bore must be kept to a minimum, a separable outer race bearing can be used with the outer race omitted. The rollers then operate directly in a housing bore of suitable hardness and finish.

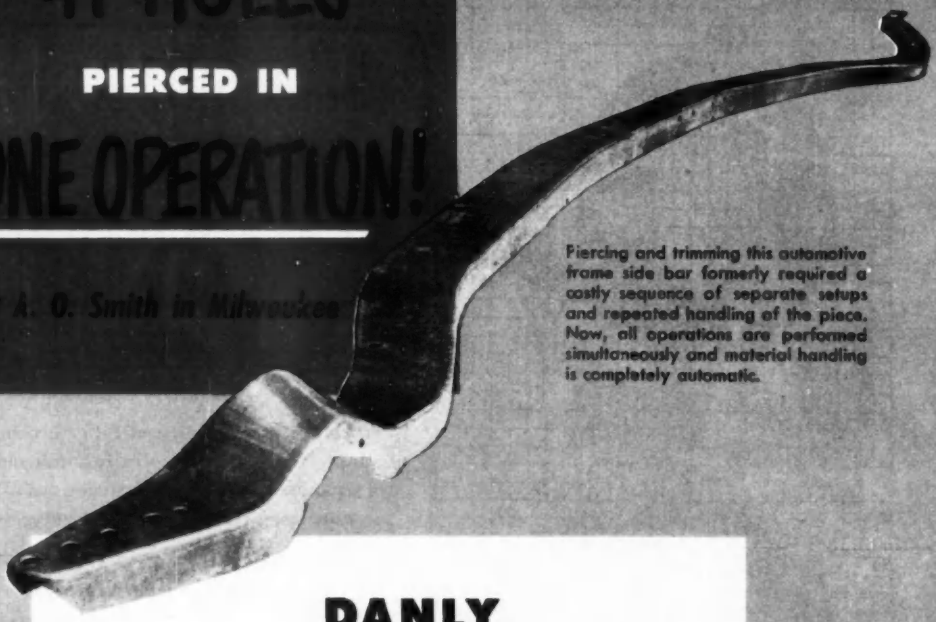
3 If the design requires that the bearing be installed as a unit, Hyatt also provides non-separable types of Hy-Load bearings.

More detailed information on Hyatt Hy-Loads or any of the other popular types of Hyatt Roller Bearings for automotive applications, may be had upon request. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J. and Detroit, Mich.

HYATT ROLLER BEARINGS

41 HOLES PIERCED IN ONE OPERATION!

at A. O. Smith in Milwaukee



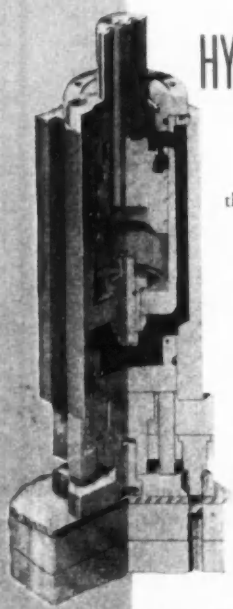
Piercing and trimming this automotive frame side bar formerly required a costly sequence of separate setups and repeated handling of the piece. Now, all operations are performed simultaneously and material handling is completely automatic.

DANLY

HYDRAULIC METALWORKING EQUIPMENT

with automatic stripping action

Cost saving solutions to metalworking problems like this typify the results you can expect with Danly Hydraulic Metalworking Equipment . . . designed and built to your specifications. Compact power cylinders like the one shown here, with capacities ranging up to 200 tons, are applied singly or in any necessary combination to help you save man hours, increase output and reduce costs. Write today for complete information . . . Danly engineers are at your service for detailed discussion of your application.



Cutaway view of a Danly Hydraulic Power Cylinder. At A. O. Smith, 16 of these units are arranged to operate simultaneously performing the multiple piercing and trimming operations described above . . . each unit complete with automatic hydraulic stripping action. Extra long precision guides permit several punches to be mounted in each unit.

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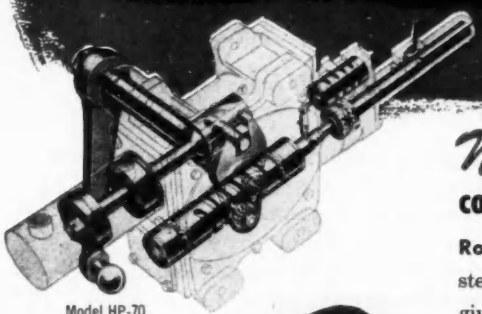
Ross HYDRAULIC POWER STEERING...SINCE 1942



Model HP-70
One of Latest
Developments in
Ross Hydrapower
Steering Program

Now . . . **EASIER, SAFER STEERING FOR COMMERCIAL VEHICLES AND PASSENGER CARS**

Ross Hydrapower not only takes the *physical effort* out of steering—with increased safety—but *Ross Hydrapower* also gives in fullest measure the *alert, responsive* quality known as "road sense"—an outstanding characteristic of *Ross Steering* for almost a half century.

Ross pioneering in assisted steering dates back to 1942 when *Ross hydraulic power steering* was chosen to solve the Army's then toughest steering problem—the 50-ton tank retriever.

While most current *Ross Hydrapower* production is devoted to military needs—as government requirements permit, *Ross Hydrapower* will bring new steering *ease, safety* and *satisfaction* to additional commercial vehicles and passenger cars.

HYDRAPOWER Ross

Cam & Lever **STEERING**

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Your Insurance Against Complaints

JUST A FEW USES:

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- Controlling temperature
- Reducing weight
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- Cushioning shock
- Filtering liquids
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Felt is not "just felt." There is a vast difference in its manufacture and efficiency. Because Western Felt for over fifty years has not, and will not, depart from its policy of maintaining the highest possible quality in material and manufacture, its products, wherever they may be employed, are your insurance against product complaints due to a Western Felt component part.

Here are just a few of its features that you can always depend on: range from wool softness to rock hardness—never loses shape—does not ravel or fray—resists oil, water, heat, age, resilient, flexible, compressible—may be cut to extremely close tolerances for small parts—unsurpassed in uniformity.

Western Felt engineers with decades of experience in the use of felt stand ready to counsel you.

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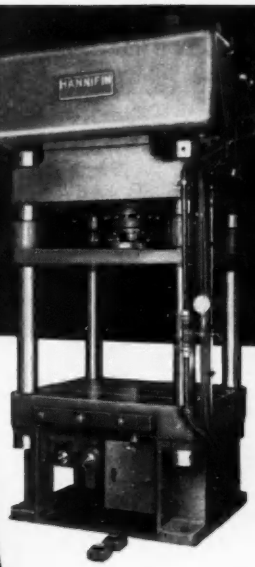
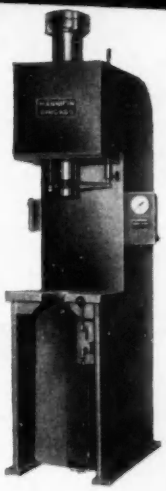
Largest Independent Manufacturers and Cutters of wool, hair and jute felts

FROM ½ TON TO 150 TONS...

You name the job We have the Press!



150-Ton Four-Column Press—a standard Hannifin design with semi-automatic cycle. Advance at high speed, feed stroke starting at pre-set point in stroke and automatic reversal. Dual electric push button control.



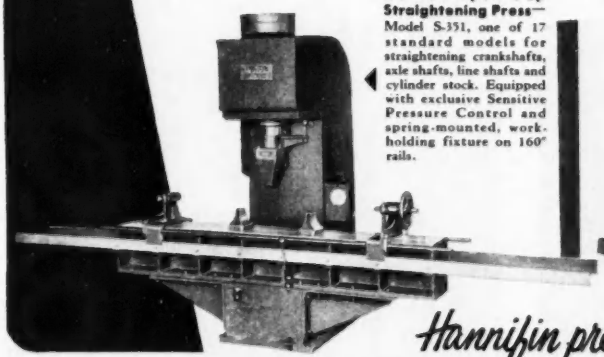
15-Ton Forcing Press—with built-in hydraulic power unit and exclusive, patented Sensitive Pressure Control. Gap, 22"; stroke, 21"; reach, 10"; table, 19" x 22" with U slot.

Molding, straightening, forming . . . assembling, riveting, punching, staking, marking . . . there is a broad variety of vitally important production functions best handled by one of the many Hannifin standard presses. For each has the easy, sensitive and safe control, the dependable, efficient operation and the rugged strength that mark it as a leader.

The Hannifin line includes more than 75 standard models of fast, self-contained presses. It's easy to find one that fits your requirements. Special adaptations in stroke, gap, clearance or controls are easily made in most models.

To find out what Hannifin Hydraulic Presses we have for you, fill in and mail the coupon. It will bring specific information . . . promptly!

35-Ton Open Gap Straightening Press—Model S-351, one of 17 standard models for straightening crankshafts, axle shafts, line shafts and cylinder stock. Equipped with exclusive Sensitive Pressure Control and spring-mounted, work-holding fixture on 160" rails.



½-Ton and 1-Ton Air-Operated Han-D-Press—designed to meet high production schedules on assembling, staking, riveting, punching, marking and pressing. Electric control for hand or foot operation.

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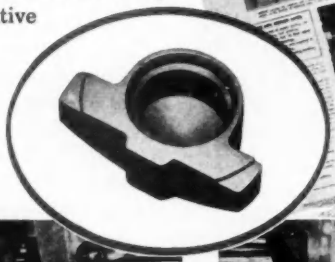
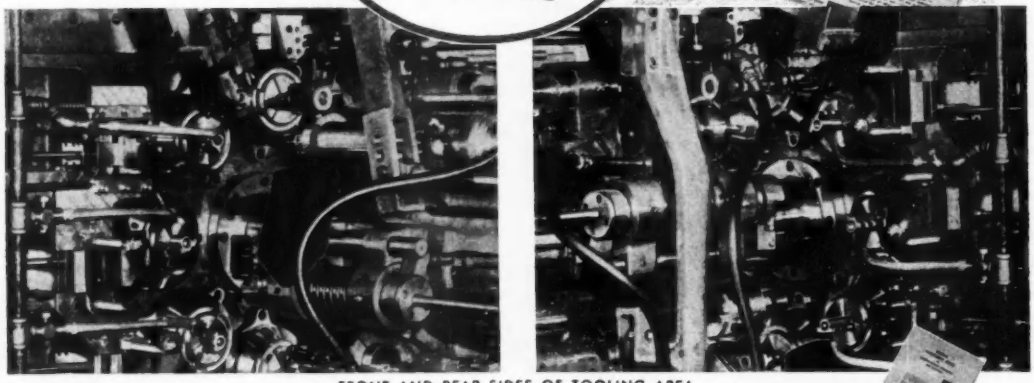
For over fifty years American Mass Production has given increasing opportunity to the Multiple Spindle Bar Automatic. But now the heat is really on!

Not the early day flash fire, nor the production pressure kind, but *induction hardening* and *quenching*. The application is performed in one position of an otherwise orthodox setup on an eight spindle CONOMATIC, in the production of universal joint bearing races and wing bushings.

The documentary importance of this application is substantiated by feature articles which appeared in three of the Metalworking Industry's leading publications. Reprints are available at no charge. Just ask your CONE Representative or contact us direct.

Any usual, or unusual, job on an "Automatic" must run or fail. CONOMATICS give the dependable performance that make the innovationary type of job pay off and result in additional assignments.





FRONT AND REAR SIDES OF TOOLING AREA

A Comparison of ALL Automatics is in favor of Cone

Conomatic CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

DESIGNS AND BUILDS TOMORROW'S MACHINERY TODAY

EQUIPMENT CORPORATION

Wean

THE celebrated Cellini helmet has become a symbol of metal-working craftsmanship. For this reason we here at the Wean Equipment Corporation have chosen it as our trade mark.

For, like the talented Cellini, Wean works with metals—designing, engineering and building products that more than just meet accepted standards. Just as Cellini, Wean begins with a problem and finishes with a workable solution that satisfies even the most exacting critic.

Assembled behind the Wean name is perhaps the nation's leading staff of metal-working engineers—a group of creative men who make a practice of finding the proper solution to the toughest machine and equipment problems.

Wean is justly proud of these men and the records they have achieved—records that we feel have firmly established them as the metal-working craftsmen of our day.

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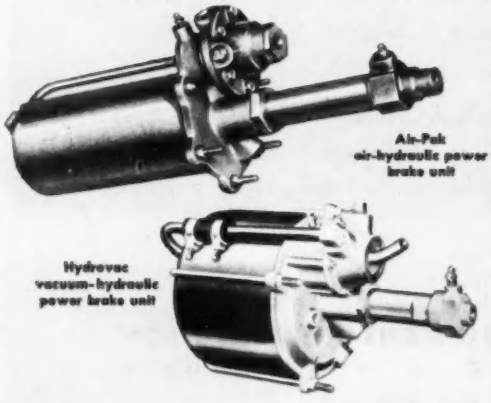
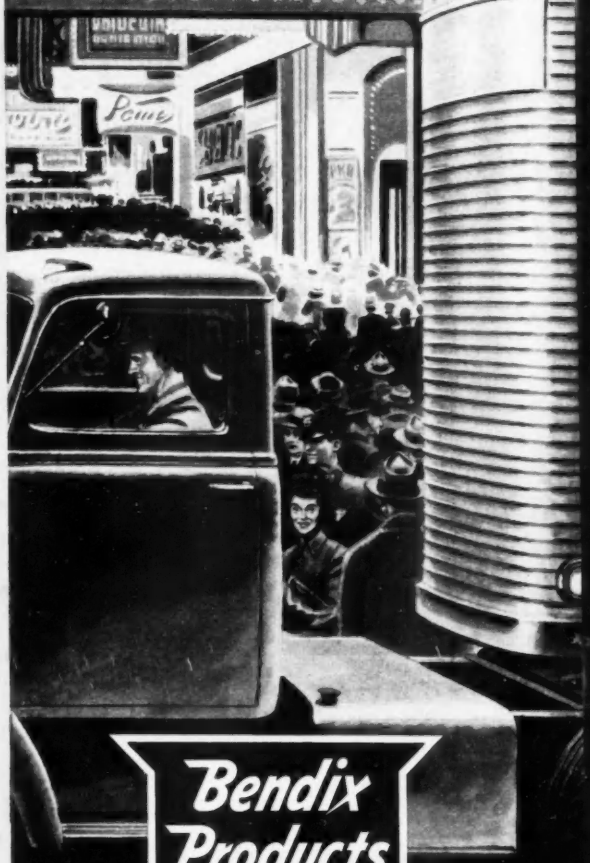


Air-Pak air-hydraulic power brake unit

Hydrovac vacuum-hydraulic power brake unit

FEATURING ★ **AIR-PAK HYDROVAC** POWER BRAKING



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High Spots of This Issue

Belgian Automobile and Truck Show

Held in Brussels last month, the thirty-fifth Belgian Automobile Show featured exhibits from eight automobile manufacturing nations. For details of these offerings, see page 32.

SAE Annual Meeting

New engineering developments presented at the recent Detroit meeting of this society include power steering, the revolutionary Hi-Jet system for cooling and lubricating tools during machining operations, and many others of great importance. Succinct extracts from papers are published. Page 34.

High Scavenging Two-Stroke Diesel

This is the story of a successful two-stroke loop-scavenged Diesel engine recently developed for road vehicles. Called the Krauss-Maffei KMD6 engine, it achieves almost 300 ton-miles per gallon. Turn to page 40.

The Horsepower Race

In the competition of high performance new engines—characteristic of the 1952 passenger car season—one criterion of possible measure is the factor of Bhp cu in. displacement. See page 49 for a rating schedule of today's makes.

Detroit and Dayton Renegotiation Conferences

Under the auspices of AUTOMOTIVE INDUSTRIES, large turnouts of key executives attended the latest regional management conferences concerning procedures in Defense contract renegotiation. Pictures and listings of all personalities there present are found on pages 50 and 51.

23 New Product Items And Other High Spots, Such As:

De Soto S-17 Custom line features 160-Hp V-8 engine; the 1952 Lincoln engine; the new Diamond T models with higher horsepower Diesel; a French gas turbine truck with two free-piston engines; machinery news; and the Business Pulse.

News of the Automotive Industries, Page 17
For Complete Table of Contents, See Page 3

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY • PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT
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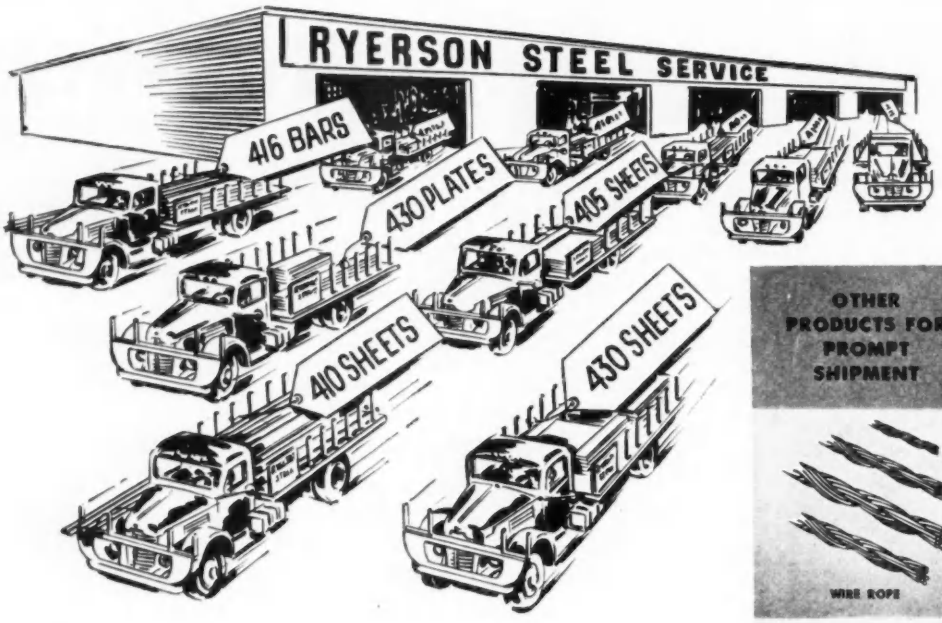

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As stainless users switch to straight chrome types, Ryerson is ready for them. Ready with the nation's largest and most diversified stocks of straight chrome stainless steels.

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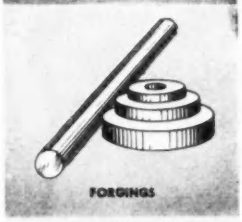
OTHER PRODUCTS FOR PROMPT SHIPMENT



News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 106, No. 4 February 15, 1952

GM Plans Power Steering for 60,000 1952 Cars

Due to the intense interest in power steering running high this season, a group of at least 200 attended the recent Mid-Michigan Section SAE meeting in Saginaw, Mich., to hear C. W. Lincoln present his paper on the Saginaw hydraulic steering gear, which has been adopted as special equipment by Cadillac, Buick, and Oldsmobile for 1952.

At the press conference, W. H. Doerfner, general manager, Saginaw Steering Gear Div., General Motors Corp., stated that his division plans to build a maximum of 60,000 power steering gear units during the year. This volume will be divided among the three GM divisions with Cadillac getting the lion's share of 50 per cent of output. The remaining 50 per cent is to be divided between Buick and Olds, Buick getting about 53 per cent of the remainder and Oldsmobile 47 per cent. On the basis of 6000 monthly, Cadillac will get 3000, Buick about 1600, and Oldsmobile approximately 1400. Price of the installation will be announced by each division in accordance with Office of Price Stabilization approval. Roughly, the unit will carry a price tag of around $200.

Looking to the future, Doerfner speculated on the probability that at least one low-priced car will offer power steering within the next year or 18 months; there is also a possibility that cost may be lower on the smaller unit. He went on to say that Saginaw has been experimenting with small steering wheels, and several cars are being fitted with 12-in. types.

GMC HYDRA-MATIC TRUCK

Most outstanding feature of the Model P152-22 parcel delivery vehicle, recently introduced by GMC Truck & Coach Div. of General Motors Corp., is the installation of dual-range, Hydra-Matic drive (see Dec. 15 issue of Automotive Industries, p. 36), which provides three speeds for city driving and four for suburban or country driving, as standard equipment. Other notable assets of the truck are: a foot-actuated parking brake; forward mounting of transmission, brake, and steering controls for maximum loading space; wide-track front axle of heavy I-beam construction; full-floating, hypoid-gear type rear axle; and extra heavy front springs. Wheelbase is 125¼ in., nominal rating is ¾-ton, and GVW is 7000 lb.

Ford Gets Contract for New Jet Engine

Ford Motor Co. has been awarded a new $30 million contract to build J-57 turbojet engines for the Air Force. The engines will be built at the Chicago, Ill., plant owned by the Air Force and now being operated by Ford; make-ready is underway there for production of the R-4360 reciprocating aircraft engine. The J-57 engine is a new type which has never been produced and will be used in several new designs of high-performance aircraft.

The Air Force has stated that its decision to use the Chicago plant was due in part to a desire to spread overhead costs over more production than is currently planned for the reciprocating engine. Actual wording of the announcement indicated that projected schedules for the R-4360 will be cut back substantially. Ford has said that a large part of the subcontracting work will be done in its own Michigan plants and in plants of other Michigan companies. Initial production, however, is still at least a year away because of the lead time required for tooling.

NPA Suspends Fisher Body Tool Contract

Considerable confusion surrounds the suspension of a $69 million machine tool contract under which Fisher Body Div. of General Motors Corp. would build Bullard vertical turret lathes. However, the latest information indicates that the National Production

News of the AUTOMOTIVE

Authority ordered the contract held up because of changes in techniques for manufacturing jet engines which resulted in easing of demand for the Bullard machine.

Under the order, Fisher was to build 757 vertical-turret, 42-in. lathes on a subcontract from Bullard Co. Tooling had almost been completed, and production was practically ready to begin. Cancellation of the Bullard order, however, would not mean that facilities set up for their manufacture would be abandoned. NPA has indicated that the facilities will be used for building other types of tools that are in short supply for defense work.

Ford, GM Raise Prices on All Car Lines

Ford Motor Co. has increased prices of its Ford, Mercury, and Lincoln automobiles, but not to the full extent allowed under the Capehart formula. Basic retail ceiling prices have been raised three per cent on the Ford line, compared with the limit of 4.97 per cent approved by the Office of Price Stabilization. Mercury and Lincoln cars were increased 1.8 per cent, although OPS previously had approved increases of 3.45 per cent for Mercury and 5.19 per cent on the new Lincoln car line.

General Motors Corp. also has increased its retail prices from 3.7 per cent to 5.1 per cent. Increases by divisions were: Buick, 3.7 per cent; Oldsmobile, 4.5 per cent; Cadillac, 4.5 per cent, Pontiac, 5 per cent; and Chevrolet, 5.1 per cent. It is understood that GM took the full increase allowed by OPS under the Capehart formula only in the case of Chevrolet and Cadillac.

Chrysler, Studebaker, K-F Get Price Boost

The Office of Price Stabilization has authorized increases in factory wholesale ceiling prices for Chrysler, Studebaker, and Kaiser-Frazer passenger cars. Increases also were authorized for the Allstate line of cars made by K-F for sale by Sears, Roebuck & Co.

Chrysler models were given percentage increases as follows: Plymouth, 4.11; Dodge, 4.32; DeSoto, 5.12; and Chrysler, 3.75. Highest increases, totaling 11.68 per cent, went to the K-F's Henry J and Allstate car, with Kaiser close behind at 11.12 per cent. Studebaker increases authorized are 7.27 per cent on the Champion and 8.17 per cent on the Commander.

The companies affected must submit to OPS new dollars-and-cents ceilings on an f.o.b. factory wholesale and retail basis, and these must be approved before they can be passed on to the public.

K-F Delivers First Aircraft Engines

Kaiser-Fraser Corp. has reported that its original contract for building Wright R-13000 engines for the Air Force has been doubled during the last year. No specific figures on the size of the contract have been revealed, except that it will be a high-volume operation. The first engines have been completed for delivery to the Air Force, using parts supplied by Wright Aeronautical Corp.

K-F is the first to start delivery of aircraft engines from Detroit and the first of Wright's licensees to get into production. It is utilizing part of its Detroit engine plant and its Dowagiac, Mich., plant to turn out the 800-hp, seven-cyl engine which will be used in training planes and helicopters.

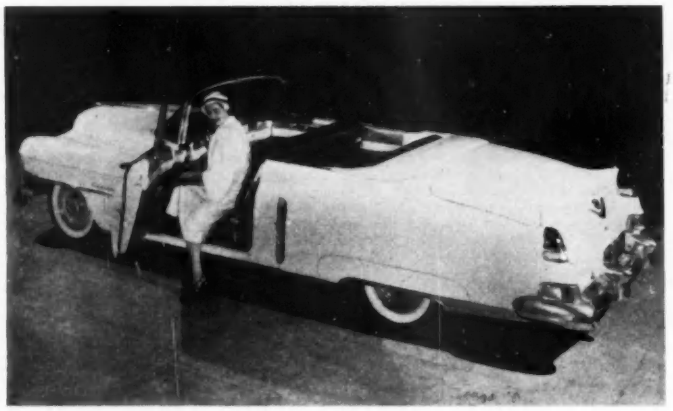
Tooling began about a year ago and will continue, and K-F expects to be able to supply most of its own requirements for major functional parts of the engine by June. All of the Dowagiac plant will be devoted to aircraft production, but automobile engine production will be maintained at the Detroit plant.

Cadillac Ups Ad Budget to $3.5 Million Total

In spite of a heavy backlog of orders, Cadillac Motor Car Div. of General Motors Corp. has announced that it will increase its advertising budget by $500,000 in 1952 to $3.5 million. Company officials explained that the step was being taken, regardless of reduced automobile production, because of their feeling that 1952 would still be a highly competitive one from a sales point of view.

Start of Packard Jet Output Is Granted High Priority

It has been reported that Government officials have taken steps to speed up the start of jet aircraft engine production in the Packard Motor Car Co. plant in Detroit, Mich. Part of an overall program to cut unemployment in the Detroit area, the plan is said to call for accelerated delivery of necessary machine tools to Packard so that it hasten work on the J-47 jet engine.



CADILLAC ANNIVERSARY SPECIAL

One of two special cars, designed and appointed by Cadillac Motor Car Div. of General Motors Corp. to symbolize its Golden Anniversary, the "Eldorado" combines the richness of yore in its gold-and-ivory treatment with luxurious appointments of the future. The long, low body of the car is finished in white, while the instrument board inserts, door moldings, and kick strips are of gold-plated, ripple-patterned metal. Glimpses of what the morrow may bring include: aircraft-type crash pad; jet-like, rear-fender air scoops; dual exhaust openings in the rear bumper; vertical pillar windshield; radio antennae mounted just forward of the tail lights; and novel upholstery.

AND AVIATION INDUSTRIES

AC Spark Plug Accelerates Work on Defense Projects

AC Spark Plug Div. of General Motors Corp. currently is employing about 20 per cent of its 11,000 employees on defense projects. Although cramped for facilities at present, new buildings are under construction. A substantial additional manufacturing area is scheduled to be completed by July, and the entire building project, comprising more than 500,000 sq ft, is to be finished in Sept.

Military products already in production include: polar converters, bomb release computers, complete bombing navigation computers, gun-bomb rocket sights, instrument clusters with waterproof instruments, several types of fire control boxes, auxiliary generators, and several types of spark plugs. Products ordered, but not yet in production, include fire control systems and K-14-C gun sight parts.

Chrysler Starts Second Unit of Engine Plant

Chrysler Corp. has started construction of the second unit ot its new engine plant at Trenton, Mich. Production of truck and industrial engines is just getting started in the company's first unit of the plant. Four models of Dodge truck engines and two industrial engines are to be assembled and tested there.

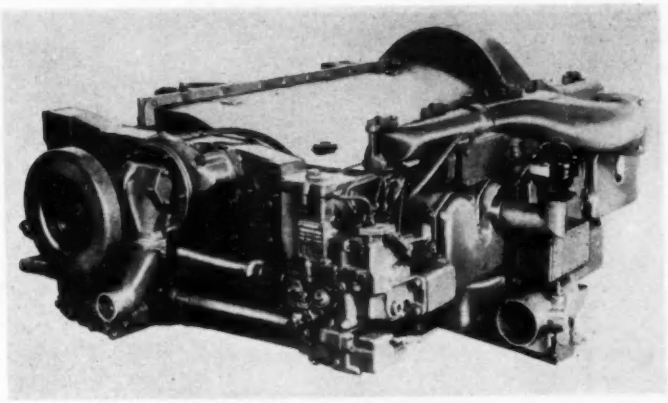
Manufacturing operations will include manufacture of engine blocks, cylinder heads, crank shafts, pistons, and other engine parts. The completed unit and the new one under construction are almost identical in size, comprising 504,000 sq ft each.

Car Makers Unconvinced on Alternate Radiator

According to some industry quarters, there still is no satisfactory substitute for copper in radiators, despite the intensive efforts of automotive research organizations to find one.

Actually, all of the larger companies, have made tests and still are not convinced that copper-coated steel is the answer, at least in its present state of development. They want to know a great deal more about its resistance to corrosion with all types of water found throughout the country, whether the copper coating can be maintained uniformly over all surfaces, whether there actually would be enough copper-coated steel available for production runs, and whether the process could be used to make cellular type radiators as well as the tube and fin construction.

Meanwhile, automotive research labs are continuing their work. It is understood that one development being looked at closely is the use of copper-coated steel for fins, which do not come in contact with the coolant.



POWERFUL CUMMINS DIESEL

Shown above is a new horizontal Diesel recently announced by Cummins Engine Co. Designated as Model NHHB-600, the engine is a six-cyl type, produces 200 hp at 2100 rpm, and has a compression ratio of 15.5 to 1. Displacement is 743 cu in. with a bore and stroke of 5 1/8" x 6". The unit, which weighs 2285 lb, has been designed especially for installation in city and intercity busses, as well as rail car application. It is currently being offered by White Motor Co. in its 44-50 passenger city transit bus (Model 1100D) and by ACF-Brill in a highway coach (Model IC-41 AD).

Schauer Settles In New Plant

Schauer Manufacturing Corp. recently moved into its new plant at Rossmoyne, near Cincinnati, O.

Atomic Research Turned on Engine Performance

Scientists are attempting to find out more about automobile engine and fuel performance through radioactive materials. The University of Michigan has made an initial test run with a thin strip of radioactive palladium foil, and further tests are scheduled. Objective is to discover if fuel combustion can be improved to produce more horsepower and also to discover what engine structure is necessary to protect passengers from radiation.

The Battelle Memorial Institute has developed a new radioactive tetraethyl lead compound to aid researchers in finding out what happens chemically inside the engine. No conclusive reports are available as yet from either of the two projects.

Boeing Set to Modify B-47 at Plant in Tucson, Ariz.

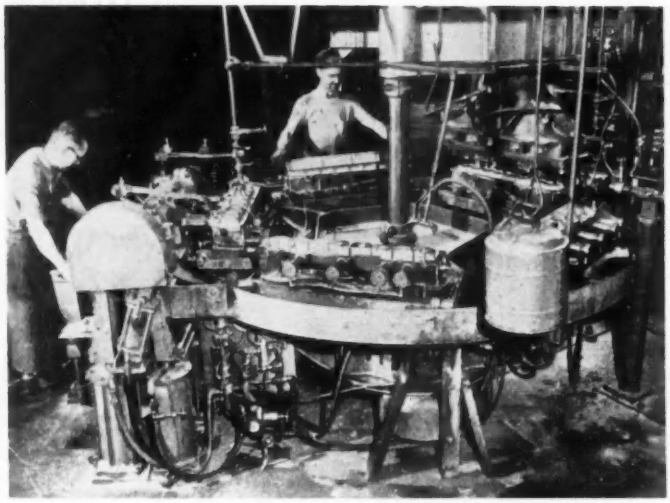
Boeing Airplane Co. announced recently the signing of a contract with the U. S. Air Force Materiel Command for a B-47 bomber modification program at Tucson, Ariz.

A subcontract, in connection with the program, has been awarded to Grand Central Aircraft Co. to provide the work force, buildings, facilities, and services at its Tucson Municipal Airport plant.

The plane is now in large-scale production at the company's Wichita, Kans., Div. In addition, both Douglas Aircraft Co. at Tulsa, Okla., and Lockheed Aircraft Corp. at Marietta, Ga., are tooling up to produce the Boeing B-47 for the U. S. Air Force.

According to the company, it has been proved more economical and practical to make special changes in new aircraft after they are completed. The alternative method—holding up all production lines while changes and modifications are introduced—reportedly tends to disrupt factory operations and delivery schedules.

News of the AUTOMOTIVE



PRACTICAL COREMAKER

An automatic coremaker, which is said to make cores faster and more accurate in size than the former hand method, has been developed by Buick Motor Div. of General Motors Corp. for use in its foundry. The simple machine consists of a turntable with five stations: one for the blow; one where a worker places the dryer on the finished core; the rollover, where the core is taken from the machine and placed on a conveyor; another where the corebox is blown and sprayed; and the last, where loose pieces are placed in location automatically. Speed, accuracy, and space economy are among the numerous practical advantages claimed for the unit.

Colbert Hits Further Cutback in Vital Automotive Output

At the start of a speech before the recent Annual Dinner of the Automotive and Aviation Parts Manufacturers, L. C. Colbert, president of Chrysler Corp. reviewed the automotive industry's impressive record in World War II. He mentioned reports that the industry was responsible for producing 25 per cent of all war products made of metal and that it could well score a similar record of achievement, if all-out war should develop.

Pointing out, however, the dangers in complacency about the present state of affairs, Mr. Colbert hit further curtailment (in the second quarter of 1952, specifically) of an automotive output that has already suffered progressive cuts totaling 40 per cent. While stating that the industry has never had any intention of delaying rearmament by a single day, he maintained that an additional cut was not necessary because it came so far ahead of dates for volume delivery of most military items.

Mr. Colbert went on to cite the seeming reluctance of Government circles to recognize fully the even greater unemployment and business dislocations in Detroit and other automotive centers that further curtailment would cause, and an apparent inclination not to give the industry and highways the ranking they deserve in relation to other so-called "defense-supporting" industries as far as allocations of scarce materials are concerned. He concluded by urging members of the industry to extend their fullest cooperation in the defense effort and seek to extend advice to those in Washington endeavoring to make important decisions regarding future planning.

Twelve-V Ignition Under Development for Cars

According to automotive industry sources, a lot of work is being done on a 12-v ignition system which possibly may come on 1953 models. A basic reason for stepping up the voltage is the requirement of current high-compression engines for a more powerful spark at the plug. It is felt that current six-v systems have about reached the limit of adequate spark under today's combustion chamber pressures. The 12-v system would require a larger battery, but it is thought that present size generators could be used and diameter of ignition wiring could be greatly reduced to result in a saving of scarce copper.

ACF-Brill Profits Sound for Nine Months of 1951

At a recent press conference Charles W. Perelle, president and general manager of ACF-Brill Motors Co., reported that during the first nine months of 1951 the firm made a net profit of $1,914,933 on net sales of $17,490,828. When totals for the entire year have been calculated, the company expects to have one of the largest net profits in its history. It is interesting to note, in this connection, that the firm suffered a net loss of $124,414 on net sales of $12,571,757 during 1950 and relatively greater losses during the two preceding years. Much of the credit for the company's improved situation has been given to Mr. Perelle, who took office May 3, 1949.

Features of the new ACF-Brill IC-41 AD highway coach were also discussed at the conference. This model is powered by a 200-hp horizontal Diesel engine, recently introduced by Cummins Engine Co. (see p. 19 of this issue).

Perfect Circle to Purchase Centrifugal Foundry Stock

According to a recent announcement, Perfect Circle Corp. has signed contracts with the stockholders of Centrifugal Foundry Co. for the purchase of the latter's entire stock holdings on or before March 31, 1952. Both companies are engaged in the production of centrifugal castings for the manufacture of cylinder liners. The acquisition of these new facilities will reportedly enable Perfect Circle to meet increasing demand for this product by engine manufacturers.

Ford May Close Some Assembly Plants Due to Materials Cuts

At a recent press conference, Henry Ford II stated that if there are further cutbacks in production, because of material shortages, Ford Motor Co. may be compelled to close some of its regional assembly plants. He did not state specifically which plants might be shut down.

AND AVIATION INDUSTRIES

Hope Rises for Improvement in Auto Output Situation

Two recent developments heightened optimism that the automobile industry may build its full allowance of 930,000 cars in the second quarter of 1952 and possibly even exceed this figure. First, the Air Force released an undetermined quantity of aluminum (estimated at somewhere between 20 and 40 million lb) which it found would not be required for its projected program.

The industry, supported by labor and the two Michigan Senators, immediately put in a claim for at least 2 million lb of the metal. Whether or not the request will be granted is still unknown, since NPA stated that a considerable portion would be used to cover Controlled Materials Plan deficits brought about by over-allotment in relation to the supply.

The second development was a visit to Detroit by a National Production Authority "task force" investigating reasons for unemployment in the automotive industry. The group received rugged treatment from automotive, labor, and political leaders during its stay and went back to Washington with a promise that it would carry a realistic story to NPA officials.

It was stressed to the "task force" members that Government planning has unnecessarily disrupted the automotive industry and that more material could, and should be, made available without affecting production of war materials at all in the present stage of the defense program. Industry leaders said that channeling more defense work into Detroit would help somewhat but was the hard and slow way to relieve unemployment; the only real solution to the problem, they said, is to allot enough materials for a reasonable car and truck output of 1,100,000 cars and 275,000 trucks.

First Convair-Liner 340 is Completed by Consolidated

The first Convair-Liner 340 (see Dec. 1 issue of AUTOMOTIVE INDUSTRIES, p. 19) recently rolled off the assembly line at San Diego, Calif., for testing and delivery in March to United Air Lines. Forty of the twin-engined, pressurized transports have been ordered by United at a cost of $23,117,000. Completion of the first plane follows signing of the contract with Consolidated Vultee Aircraft Corp. by one year.

The new airliner has structural provision for future turbo-prop engines and other innovations in commercial aviation. Wing span is 105 ft, eight in.; fuselage length, 79 ft, two in.; and gross weight, 45,000 lb.

The plane is equipped with automatic, full-feathering, reversible Hamilton Standard propellers and two 2400-hp Pratt & Whitney CB-16 engines. It will carry 44 passengers, a crew of three or four, and 850 pounds of cargo at almost 300 mph. Non-stop cruising range is more than 1000 miles.

Rolloy Acquires Piston Rights from Fairchild

According to a recent announcement, bi-metallic pistons for automotive engines will be produced in Australia by Rolloy Piston Co. Pty., Ltd., of Port Melbourne under a license agreement with the Al-Fin Div. of Fairchild Engine and Airplane Corp. Rolloy has obtained exclusive rights for manufacture in Australia of bi-metallic pistons using the patented Al-Fin process of molecularly bonding aluminum to steel or iron. Under its license Rolloy also will manufacture bi-metallic brake drums, sleeve bearings and bushings, timing gears, and cylinder barrels.

Plastic Delta-Shaped Wing for Aircraft to be Shown

According to recent reports, a full-size, delta-shaped aircraft wing made of highly polished molded plastic will be featured at the British Industries Fair, scheduled to be held at Earls Court, London, May 5 to 16. It is claimed that the new technique for molding plastic eliminates the two largest cost elements in plastic production —steel dies and high-pressured hydraulic machinery.

It is reported that work has already started on plastic gliders and that these may be flown in the near future. A delta-shaped plastic aircraft is expected to be airborne within two years.

Reynolds to Build Plant in Arkansas

According to recent reports, Reynolds Metals Co. is now prepared to start construction of another aluminum plant in Arkansas with an estimated capacity of over 100 million lb of primary aluminum. At press time, the company had not yet decided on which of three possible sites (Arkadelphia, Benton, and Helena) to use for the new facilities.

IMPROVED AIR FORCE TRAINER

A new pressurized T-29B navigator-bombardier trainer prepares to take-off from a Consolidated Vultee Aircraft Corp. factory for delivery to the U. S. Air Force. The principal exterior difference between this craft and the former T-29, which was not pressurized for high-altitude flying, lies in the installation of three astrodomes and one periscopic sextant atop the fuselage, instead of four astrodomes on its predecessor. More advanced electronic systems and other improvements have been incorporated.

News of the AUTOMOTIVE

Willys to Produce an Improved Jeep

According to a recent announcement, design of an improved and more powerful model of the jeep has been approved by the Army Ordnance Corps and is scheduled for production this spring by Willys-Overland Motors, Inc. The new jeep is five in. longer and two in. wider than existing models. Power is provided by the new 72-hp F-head engine in place of the present 60-hp L-head engine. The more powerful engine and improved fuel economy, coupled with a larger gas tank, reportedly will increase the jeep's cruising range from 180 to 309 miles without refueling.

Ordnance-designed kits supplied with each jeep are said to adapt it to arctic, desert, or water use. Snorkel (intake) and snorter (exhaust) tubes allow the engine to "breathe" while submerged. The tubes can be installed in less than 15 minutes.

Safety features of the new vehicle include improved brakes for faster stopping, flanged fenders which keep mud from splashing the windshield and obstructing the driver's view, and a new machine gun mount opposite the driver's side of the front seat for added protection to the crew.

AMA Issues Official 1951 Vehicle Totals

Final official tabulations of motor vehicle production in 1951 have been completed by the Automobile Manufacturers' Association and show that the industry last year turned out 5,337,729 passenger cars, compared with an all-time high of 6,665,863 the previous year. Truck production hit a record peak of 1,420,432 units to surpass the 1950 level by more than 88,000. Bus production in 1951 totaled 9453 units, or nearly double the 4908 produced the previous year. Total production of motor vehicles was 6,767,614 units, compared with the previous all-time record of 8,003,045 turned out in 1950.

Final figures also show exports of passenger cars took a sharp upturn last year, totaling 247,741 against 152,925 in 1950. Trucks sold to foreign markets also showed a sharp increase, totaling 472,742 units for an increase of nearly 170,000.

Vehicle Scrappage Set New Record in 1951

If scrappage of automobiles this year continues at the same high rate that existed through 1951, nearly as many cars will go off the road as are produced. According to preliminary estimates by R. L. Polk & Co., scrappage last year reached an all-time high of 3.7 million cars. As a result of the high scrappage rate, total passenger cars in use July 1, 1951, increased by only 2,592,000 units, in spite of the more than 6.3 million new cars registered during the preceding 12 months.

The truck scrappage rate also hit a record with 660,000 going off the road last year, but the disparity between that figure is much smaller in relation to expected production this year than is the case of passenger cars. However, as a result of the high truck scrappage, trucks in use during the year ended July 1, 1951, increased by only 488,000, compared with registrations numbering 1.1 million. Due to a combined car and truck scrappage total of 4.36 million last year, total vehicles in use increased by only 3,000,000, despite registration of 7,453,000 new vehicles.

NPA Threatens Copper Cut for Repair Parts

Makers of automotive replacement parts got some bad news from Washington late in Jan., when the National Production Authority indicated that it might cut allotments of copper by about 25 per cent in the second quarter below the prevailing level. Parts requiring copper have not been on the critical list but have been rather tight all along; consequently, field stocks are not adequate to withstand such a cut.

It is a little early yet to tell whether copper will actually be reduced to such an extent, but, if it is, it could mean that some cars might be laid up a few months hence for lack of copper items. It is generally felt in the industry that if the situation gets that bad, the Government will move promptly to make more copper available.

Outboard Marine Buys R.P.M. Mfg. Stock

Outboard Marine & Mfg. Co. has acquired all the outstanding stock of R.P.M. Mfg. Co., LaMarre, Mo. R.P.M. manufactures rotary power lawn mowers which are distributed principally through Sears-Roebuck & Co. Outboard Marine, which manufactures Evinrude and Johnson outboard motors, will continue production of lawn mowers at the R.P.M. plant.

Bendix Radio Turns Out its Millionth Auto Set

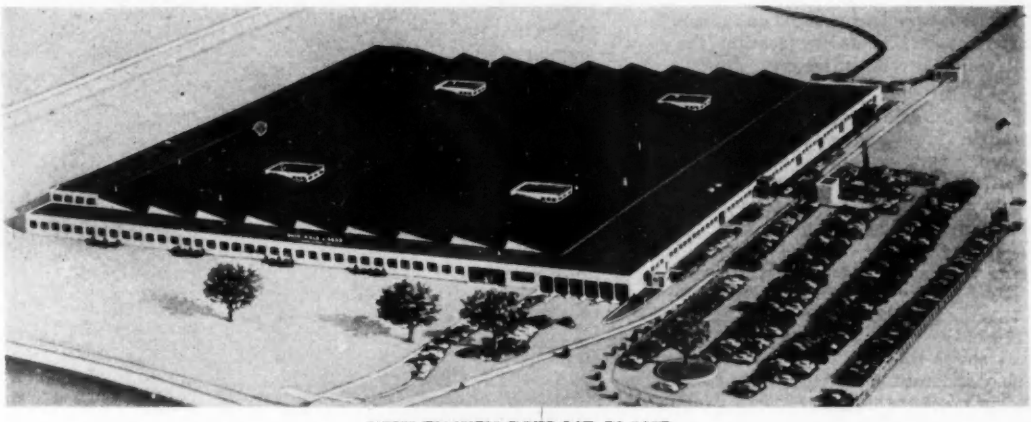
Four years after completing the first set, Bendix Radio Communications Div. of Bendix Aviation Corp. recently turned out the one millionth automobile radio for Ford Motor Co.

REGIONAL SALES OF NEW PASSENGER CARS

Zone	Region	November 1951	October 1951	November 1950	Eleven Months 1951	Eleven Months 1950	Per Cent Change: November over October	Per Cent Change: Nov. over Nov. 1950	Per Cent Change: 11 Months 1951 over 1950
1	New England	17,701	20,972	24,140	270,498	323,588	−15.60	−26.68	−16 41
2	Middle Atlantic	62,416	66,918	91,087	908,313	1,087,656	− 6.73	−31.49	−16 49
3	South Atlantic	39,253	45,943	52,499	561,938	674,686	−14.57	−25 24	−16.72
4	East North Central	80,089	97,572	98,274	1,220,448	1,416,461	−18.01	−18.51	−13.84
5	East South Central	18,241	18,079	22,401	223,695	288,914	+ 0.89	−18 58	−22.58
6	West North Central	32,594	41,025	43,444	493,002	614,887	−20.56	−24 98	−19.83
7	West South Central	35,305	33,159	43,952	423,335	541,820	+ 6.47	−19.68	−21.87
8	Mountain	12,841	11,857	16,355	161,128	203,213	+ 8.29	−21 49	−20.71
9	Pacific	33,659	37,537	52,031	488,462	622,954	−10.34	−35.31	−21.59
	Total—United States	332,099	373,162	444,193	4,750,819	5,774,179	−11.01	−25.24	−17.73

States comprising the various regions are:—Zone 1: Conn., Me., Mass., N. H., R. I., Vt.—Zone 2: N. J., N. Y., Pa.—Zone 3: Del., D. of C., Fla., Ga., Md., N. C., S. C., Va., W. Va.—Zone 4: Ill., Ind., Mich., Ohio, Wisc.—Zone 5: Ala., Ky., Miss., Tenn.—Zone 6: Iowa, Kan., Minn., Mo., N. D., S. D.—Zone 7: Ark., La., Okla., Tex.—Zone 8: Ariz., Colo., Ida., Mont., Nev., N. M., Utah, Wyo.—Zone 9: Cal., Ore., Wash.

AND AVIATION INDUSTRIES



NEW TIMKEN-DETROIT PLANT

An important part of the company's far-flung group of decentralized manufacturing facilities, the new factory occupies nearly 400,000 sq ft of floor space in a modern, single-story building of sawtooth construction. It will constitute a completely integrated manufacturing unit for machining, heat-treating, and assembly operations with a well-equipped metallurgical laboratory. The entire output of the plant will be for defense, and, at full capacity, will employ 1600. Emphasis will be on production of units for six-by-six Army trucks.

Production Underway in New Timken-Detroit Ohio Plant

Completed in only 10 months, Timken-Detroit Axle Co.'s new Ohio Axle & Gear Div. plant (see photo above), Newark, O., has started production of axles and transfer cases for military trucks. Location of the plant is in keeping with a basic plan of the firm to follow closely recommendations of the National Security Resources Board regarding dispersal of manufacturing facilities. The site was also chosen because of its proximity to raw material sources and the availability of good labor markets.

The new facility is gradually moving toward full production. Machine tools and materials-handling equipment are being installed and put into operation as rapidly as received. Much of the machinery has been provided through the acquisition of military surplus machines and rebuilt to serve the needs of axle manufacturing; however, many of the tools have been ordered from machine tool builders with resulting extended deliveries.

Ohio Piston Co. Sold to K. McKinley Smith

K. McKinley Smith of Ridgefield, Conn., formerly vice president of American Steel & Pump Corp., has purchased Ohio Piston Co., Cleveland, whi h manufactures automotive and aircraft pistons. Purchase price is reported to be about $1 million. Mr. Smith will assume the presidency of the company, but otherwise there will be no substantial change in the management and policy.

Industry Faces Trouble on Further Price Hikes

As far as car prices are concerned, the Office of Price Stabilization is expected to be very tough indeed about approving any further boosts beyond the current round. In fact, the agency has indicated that companies will have to prove that their profits have fallen below 85 per cent of the 1946-49 average before it will even listen to a request for higher prices.

AAA to Celebrate Its 50th Anniversary

The American Automobile Association will celebrate its 50th anniversary in 1952 with a series of special events depicting a half century of national motoring progress. Arrangements for the Association's anniversary celebration are being made under the direction of a special golden jubilee committee. Among its members is Paul Wooten, Washington, D. C., member of the editorial board of AUTOMOTIVE INDUSTRIES.

Ryerson Plan to Aid Release of Both New Steel and Scrap

A plan designed to get stagnant steel and idle equipment into use, or moved to the steel mills as scrap, has recently been announced by Joseph T. Ryerson & Son, Inc. Steel users are being urged to check their inventories of steel which is not being used or marked for use, plus their idle or discarded metalworking machinery and allied equipment, and then decide what should be sold, kept, or scrapped.

To help steel users dispose of items they are willing to sell, Ryerson is offering to publish without charge classified advertisements in its pictorial-type newspaper, circulated nationally to more than 100,000 firms in all lines of business. In its letter to customers explaining the plan and offering to run free advertisements, Ryerson points out that the program is designed as an exchange between steel users; in short, it makes usable steel and equipment that may be lying dormant available to someone else who can use it.

Production scrap, of course, generally moves promptly to the steel mills without delay or prodding. The Ryerson plan approaches the problem from another angle and is aimed primarily at prying loose unused steel and equipment and getting it into use, or getting it scrapped, if it is found to be unusable.

(*Turn to page* 142, *please*)

For either production light, this sales appeal is right!

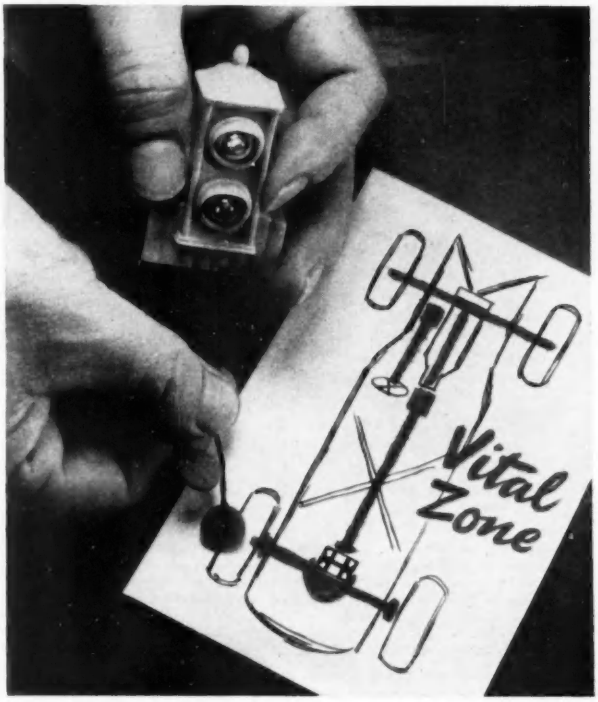
WHATEVER signals come from Washington—"go ahead" or "slow down"—auto makers will have a selling job to do.

If the supply of cars is short, there'll be the job of *keeping* customers sold on the cars they have bought. If cars are plentiful, the sales job will be a competitive one.

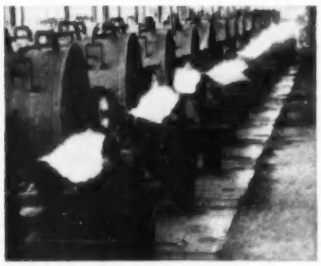
In either case, you can count on *value* to help do the job. Good *value* built into a car keeps a buyer sold on his car longer. And value is the big thing customers look for when they're in a new-car buying mood. Especially value in the "vital zone"—the moving parts where value counts the most. How to be sure of getting value in the "vital zone" parts you buy? This formula may be helpful:

$$Value = \frac{quality + service + public\ acceptance}{price}$$

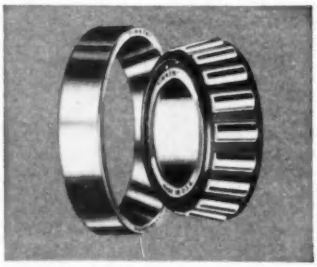
It shows that price is only *one* factor in value, and must be weighed in relation to the factors *above* the line. Timken® bearings give you far more above the line than any other tapered roller bearings, as shown in the chart at lower right. And in terms of value features, Timken bearing prices are lower today than ever. The Timken Roller Bearing Company, Canton 6, Ohio.



How TIMKEN® bearings give you value where it counts most . . . in the "vital zone":



HARD OUTSIDE—TOUGH INSIDE. Cups, cones, and rollers of Timken bearings are made from Timken fine alloy steel, then case-carburized in furnaces like these to give a tough, shock-resisting core and hard, wear-resistant surface. It's one reason for the long life you get from Timken bearings.



PINION-PROVED. On the pinion—toughest bearing application in the car—Timken bearings are standard on all but two makes of cars. Throughout the "vital zone"—in pinions, wheels, differential, transmissions, steering gears—Timken bearings give top value.

ONLY TIMKEN BEARINGS GIVE YOU ALL THESE VALUE FEATURES

QUALITY

1. Design leadership
2. Steel made in our own mill
3. Precision manufacture
4. Rigid quality control
5. More than 50 years' experience

SERVICE

6. Unequalled engineering service
7. Unequalled research and development facilities for your use
8. Installation service in the field
9. Widest range of sizes
10. Most dependable source of supply

PUBLIC ACCEPTANCE

11. First choice throughout industry
12. Best-known name in bearings
13. Widespread advertising

it's TIMKEN for VALUE

TRADE MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ↕ AND THRUST →◎← LOADS OR ANY COMBINATION ✳

Men in the News

Current Personnel Appointments and Changes at Plants of Automotive Manufacturers and Their Suppliers

E. W. Bliss Co. — J. H. Tredinnick has been named executive vice president.

Westinghouse Electric Corp.—**Tom Turner** has been named vice president in charge of the Motor and Control Div., while **T. I. Phillips** has been chosen staff vice president in charge of manufacturing. **Robert D. Blaiser** has been elected vice president in charge of industrial relations, and **John E. Payne** has been made vice president in charge of the central sales district.

Magnecord, Inc.—**William E. Farrher** has been appointed assistant advertising manager.

Magnecord, Inc. — Robert E. Bird has been appointed contract sales manager.

Eaton Manufacturing Co.—R. H. Gale has been selected as sales promotion manager.

Axelson Manufacturing Co.—**Victor Mancuso** has been elected executive vice president and assistant general manager.

Kling Bros. Engineering Works—**Robert Picchietti** has been named purchasing agent.

Lockheed Aircraft Corp., Georgia Div.—**Daniel J. Haughton** has been appointed general manager, **K. V. Sampson**, director of administration, and **Fletcher Brown**, manufacturing head.

Magnecord, Inc.—**Armin P. Buetow** has been named executive vice president.

Nash-Kelvinator Corp., Nash Motors Div.—**John H. Sawyer** has been appointed works manager at the El Segundo, Calif., assembly plant.

Nash - Kelvinator Corp., Nash Motors Div. — M. L. Hudson has been chosen assistant sales manager of export operations.

General Motors Corp., Chevrolet Motor Div.—**P. A. Collins** has been appointed executive assistant chief engineer, while **E. J. Premo** and **C. W. Frederick** have been made assistant chief engineers, in charge of design engineering and experimental and production engineering, respectively. **W. T. Burwell** has been appointed chassis design engineer, and **E. J. Luxmore** has been chosen body design engineer. **Norman J. Ellis** has been named general director of industrial relations.

Texas Engineering & Manufacturing Co., Inc.—**Harold B. Ridgley** has been promoted to tooling superintendent.

Evans Products Co.—**Sam Hudson** has been named advertising and public relations manager.

Firestone Tire & Rubber Co.—**Earl B. Hathaway** has been promoted to sales manager, while **L. G. Fairbank** will serve as assistant general sales manager. **Victor D. Kniss** has been chosen general merchandising manager.

Gould-National Batteries, Inc.—**Willard C. Shull** has been appointed special assistant to the president.

Century Drill and Tool Works—**Ben T. Cowherd** has been named president.

Willys-Overland Motors, Inc.—**William J. Wade** has been appointed director of administrative services.

Bendix Aviation Corp., Scintilla Magneto Div.—L. J. Garday has been named chief engineer of Diesel Fuel Injection Equipment.

Creative Industries of Detroit — Rex A. Terry, former Chrysler Corp. executive, has been appointed general manager.

U. S. Rubber Co., Mechanical Goods Div.—**Louis J. Coppola** has been appointed manager of government sales.

Essex Rubber Co.—**Carroll Hall** has been named assistant factory superintendent.

Ford Motor Co.—**Charles R. McCormick** has been named manager of the Green Island, N. Y., plant.

Trackson Co.—**William G. Thannert** has been chosen factory manager.

(*Turn to page* 154, *please*)

Necrology

William H. Oldacre, 59, president of D. A. Stuart Oil Co., Ltd., died Jan. 18, in Chicago, Ill.

Clinton E. Hurlock, 71, automotive-aviation pioneer and former White Motor Co. official, died Jan. 20, in Cleveland, Ohio.

Samuel S. Evans, 46, sales manager of the Replacement Div. of Wilkening Manufacturing Co., was killed in a plane crash Jan. 22, in Elizabeth, N. J.

IT IS A BRONZE-ON-STEEL (Copper-Lead) BEARING

... pre-cast bearing bronze powder bonded to copper coated strip steel—a very modern type sleeve bearing developed and patented by Johnson Bronze. This combines the fine bearing qualities of copper-lead alloy with the strength and other physical properties of the steel back. It is light in weight and low in cost—is widely used in automotive and farm equipment, and has certain important industrial uses. Through fifty years of sleeve bearing progress Johnson Bronze has developed and perfected several types of sleeve bearings, each for a particular purpose.

Johnson engineers will be glad to consult with manufacturers and recommend the correct type and design of sleeve bearing for any application. Write, wire or phone today.

SLEEVE BEARING HEADQUARTERS *Since* 1901

Johnson Bronze

625 SOUTH MILL STREET • NEW CASTLE, PA.

BUILD THEM BETTER

WITH SHAKEPROOF® Lock Washers

Multiple tapered-twisted teeth bite deeply to resist vibration loosening—lock even tighter as vibration increases!

EXTERNAL | INTERNAL | COUNTERSUNK | EXTERNAL-INTERNAL

A size and type to meet your specific fastening need!

DOME PLAIN PERIPHERY | DOME TOOTHED PERIPHERY | DISHED PLAIN PERIPHERY | DISHED TOOTHED PERIPHERY

SEND FOR FREE SAMPLE KIT, TODAY!

Make your own tests . . . see how every fastening can be positively locked against the hazard of vibration loosening. Ask for Sample Kit No. 21.

KEPS

SEMS

For maximum manufacturing efficiency, SHAKEPROOF Lock Washers are available pre-assembled to screws (SEMS) or nuts (KEPS).

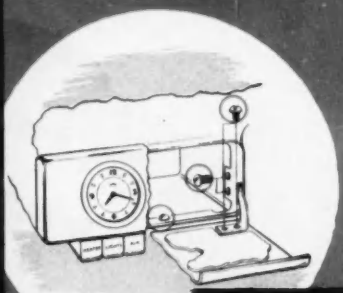
SHAKEPROOF inc.

"Fastening Headquarters"

DIVISION OF ILLINOIS TOOL WORKS

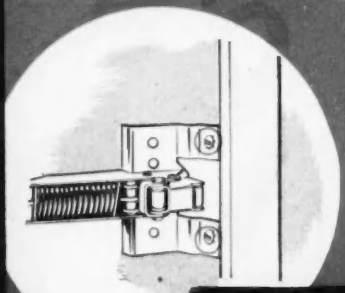
St. Charles Road, Elgin, Illinois

In Canada, Canada Illinois Tools Ltd., Toronto, Ont.



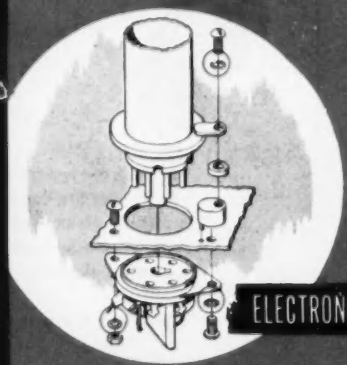
AUTOMOBILES

Here SHAKEPROOF Lock Washers are used to lock glove compartment assembly fastenings tight . . . positive protection against vibration loosening and the abuse of frequent slamming.



REFRIGERATORS

This refrigerator door latch mechanism is carefully adjusted for proper closing action. SHAKEPROOF Lock Washers hold the fastenings tight and prevent shifting of the assembly in service.



ELECTRONICS

This application is typical of the extensive use of SHAKEPROOF Lock Washers in electrical and electronic assemblies of all kinds, protecting vital fastenings against loosening and assuring efficient electrical grounding.

(*Advertisement*)

3 reports

On the new Steam Homo method for bluing

1 Solves cadmium shortage

The cadmium shortage caught a New England plant with its inventory down. At the suggestion of an L&N field engineer, they used a Steam Homo already in their heat-treat to blue some sample parts. Now, 80% of the parts that were previously cadmium plated on one of their products are blued. When cadmium is again available, they intend to stick with Steam Homo bluing. Close fitting parts operate smoother . . . costs are lower . . . and, they never have to worry about a steam shortage. Another Steam Homo is on order.

2 Eliminates hazards

A large manufacturer of tools didn't like the smell and hazards of the bluing method being used on die stocks and tap wrenches. After a demonstration, the firm switched to the Steam Homo Method. Now, operating people are happy . . . working conditions greatly improved. So many other uses for this versatile furnace have been found that now there are seven Steam Homos . . . with four more on order.

3 Better corrosion resistance

A large midwestern manufacturer tested several methods of bluing stators and rotors of electric motors. Parts were blued, and then placed in a humidity cabinet at 100% humidity and 110 F until red rust appeared. Steam Homo blued parts were still in good shape after three months. The other parts had rusted in less than half this time. Now that the Steam Homo Method is an integral part of their production set-up, their inspectors claim that color uniformity and general appearance are the best they've ever seen.

THESE are typical examples of the results plants all over the country are getting with the new Steam Homo Method for bluing. Durable, uniform, corrosion resistant and eye appealing, this type of finish can be applied to any iron or steel product.

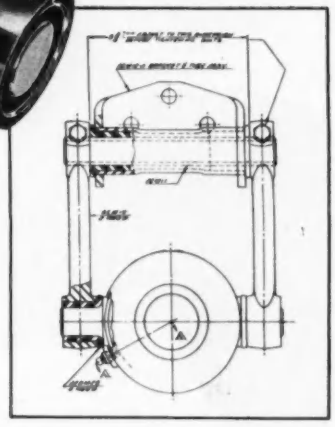
Because steam is used as the furnace atmosphere, the process is clean, non-hazardous and inexpensive . . . the Steam Homo can be installed directly in production lines.

To find out what the Steam Homo Method can do for your product, get in touch with the nearest L&N office or write to 4966 Stenton Ave., Philadelphia 44, Pa.

LEEDS NORTHRUP

Jrl Ad T-620(34)

the LONG and SHORT of it



A midshaft bearing hanger for trucks that permits standardizing on propeller shaft lengths.

THOMPSON engineering has perfected a center bearing hanger assembly that assures exceptional ease of service. The unit is completely symmetrical. Its flexibility eliminates the need for precise positioning by shims. Adjustments are eliminated because the bearing is retained by two simple snap rings.

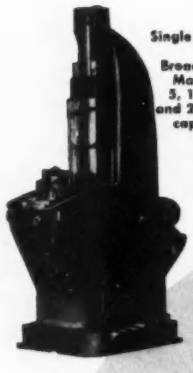
Standard annular ball bearing has longer life and greater capacity than self-aligning type. Free swinging, the swing arms and rubber bushings eliminate cramping and thrust loading of the bearing due to frame twist and drive line movement. A combination of shaft seals and slingers provides ideal bearing operating conditions.

High frequency vibration is reduced by the use of 4 small rubber bushings widely spaced and acting in tandem instead of the conventional large mass of rubber that permits major displacement resulting in shaft shimmy. The hanger insulates the vehicle drive line from the frame, reducing the tendency to transmit noise to the vehicle cab.

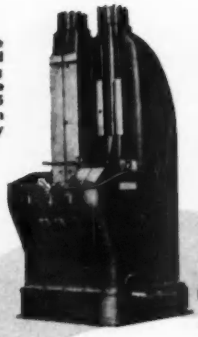
Investigate this Thompson development. Let us tell you how it will cut production and distribution costs. If you have steering or chassis problems, let Thompson engineers help you solve them. Thompson Products, Inc., 7881 Conant Avenue, Detroit, Michigan. Phone: WA 1-5010

Thompson Products, Inc.

DETROIT DIVISION

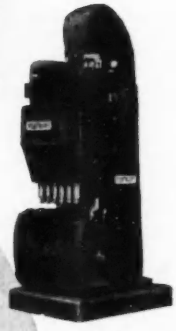


Single Slide and Broaching Machine 5, 10, 15 and 25 ton capacity



Duplex Surface Broaching Machine 5, 10, 15 and 25 ton capacity

Continuous Type Broaching Machine Built in Four Sizes



Stub Type Cylinder Boring Machines

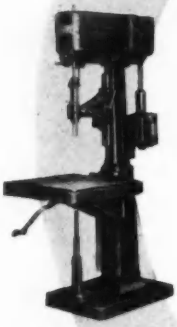
FOOTBURT LINE OF PRODUCTION MACHINES

engineered for production

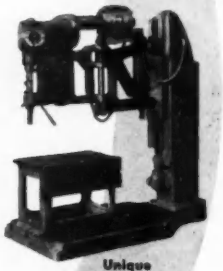
Way Type Drilling, Boring, Reaming, Tapping and Milling Machines with One, Two or More Ways . . . Station Type Machines . . . Center Column Type Machines . . . Cylinder Boring Machines . . . Inverted Drilling Machines . . . Surface Broaching Machines . . . Sensitive Drilling Machines . . . Hammond Radial Drilling Machines . . . Hammond Surface Grinding Machines . . . Manufacturing Type High Duty Drilling Machines . . . Independent Feed Drilling Machines . . . Special Machines.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

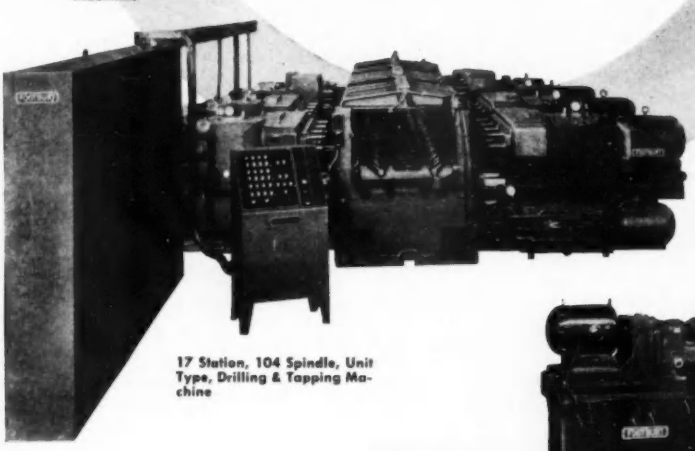
Detroit Office: General Motors Building



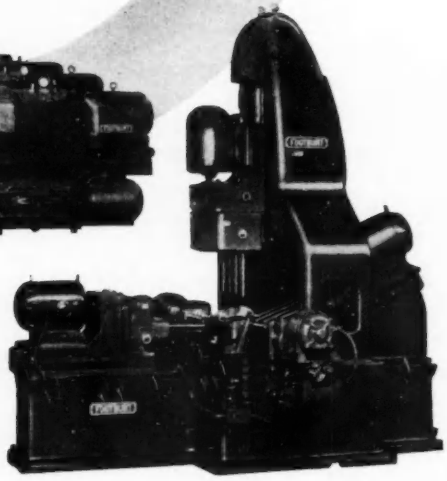
1, 2, 3, 4 and 6 Spindle Sensitive Drilling Machines



Unique Bracket Type Hammond Radial Drilling and Tapping Machine



17 Station, 104 Spindle, Unit Type, Drilling & Tapping Machine



Five Way 21 Spindle Lead Screw Tapping Machine

FOOTBURT *production machine tools*

. . . a time tested line of machine tools

SEALED TO ORDER BY VICTOR

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Compressible to $^{3}/_{64}$" average on engine, VIC-2-FOLD is the thinnest practical metal-encased asbestos gasket construction, utilizing the high strength of steel and the corrosion-resistance of copper. Note how steel bottom layer is formed up in combustion chamber openings, overlapping copper top layer for maximum protection against breakdowns and blowouts. Inversely, in coolant openings, copper layer is formed down to overlap steel layer, for maximum corrosion-resistance in contact with coolants and anti-freeze solutions.

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VICTOR GASKETS AND OIL SEALS — SEALING PRODUCTS THROUGH RESEARCH

VICTOR

"ORIGINAL EQUIPMENT"

Gaskets and Oil Seals

SEALING PRODUCTS EXCLUSIVELY

Belgian Automobile Attracts Large Field of

By W. F. Bradley
Special European Correspondent
for AUTOMOTIVE INDUSTRIES

Brussels, Belgium

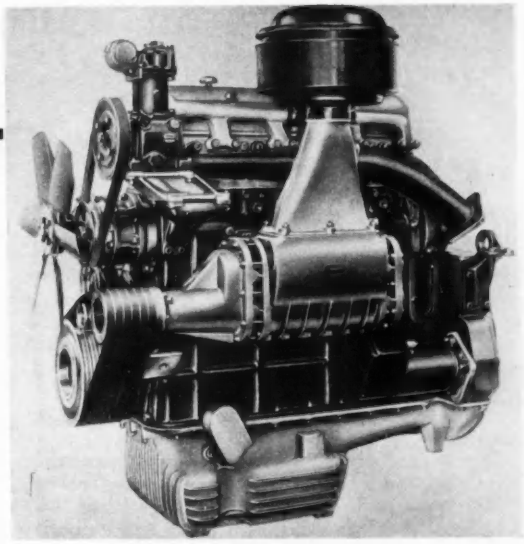
THE Thirty-fifth Belgian Automobile Show, held in Brussels late last month, featured exhibits from eight automobile manufacturing nations. Britain headed the list with 34 makes of cars and trucks, followed by the United States with 27, Germany with 22, France with 17, and Italy and Belgium with four each. The other nations represented were Czechoslovakia and Scandinavia.

Belgium is now an assembly nation, with very little automobile manufacture. Probably 90 per cent of the American automobiles sold in Belgium are assembled there, thus getting advantage of a lower import duty, which is six to 12 per cent instead of 24 per cent. France is following along the same lines, for Citroen assembles a large number of its models and a few are now being assembled by Renault. Standard has an assembly organization at the Imperia factory.

The only remaining three of the original group of Belgian automobile manufacturers—Miesse, Brossel, and F.N.—have formed a technical and commercial combine, under which production is grouped. F.N. is manufacturing two types of six cylinder, L-head engines of 105 and 92 hp. One of these is used in a long wheelbase coach chassis, with unit clutch and five-speed transmission, and a double reduction rear axle. The five-ton model with a smaller engine has a four-speed transmission. This production is in addition to motorcycles and jet engines under Rolls-Royce license. Miesse is Belgian distributor for Mack trucks, the Nash passenger car, which is assembled in Brussels, the Daimler truck, and Gardner engines. Brossel holds the distributorship for British Leyland. This grouping of Belgian, British and American units results in the production of vehicles of an international character, in some cases units from all three nations being found in the same chassis. For instance, Miesse had a chassis with a 112 hp Gardner Diesel mounted in front, a Daimler fluid flywheel, and a centrally-mounted Z.F. six-speed transmission with electric control and overdrive on sixth. Miesse

Rover gas turbine powered car

and Truck Show Exhibitors



Krupp Sudwerke two-stroke Diesel.

also showed a centrally placed underfloor Gardner; a three-axle Mack; a long-distance coach chassis with Gardner engine; an Atkinson with underfloor and forward engine; and a four-wheel drive truck. This grouping of interests gives the company a very broad range of heavy commercial vehicles.

It was announced also that a Belgian group had been formed under the control of M. Van Rogen to handle the British Land Rover. A War Department order for 5500 of these vehicles has been obtained, and they will first be imported complete from the Birmingham factory, then assembled, and finally manufactured under Rover control in a portion of the former Minerva factory at Antwerp. In addition to this it is stated that the Willys Jeep is being assembled in large quantities for the War Department at the Ateliers de la Dyle, at Malines.

Continental General Motors has started construction of an important factory at Antwerp, where radiators will be manufactured for all of the General Motors assembly plants outside the United States and

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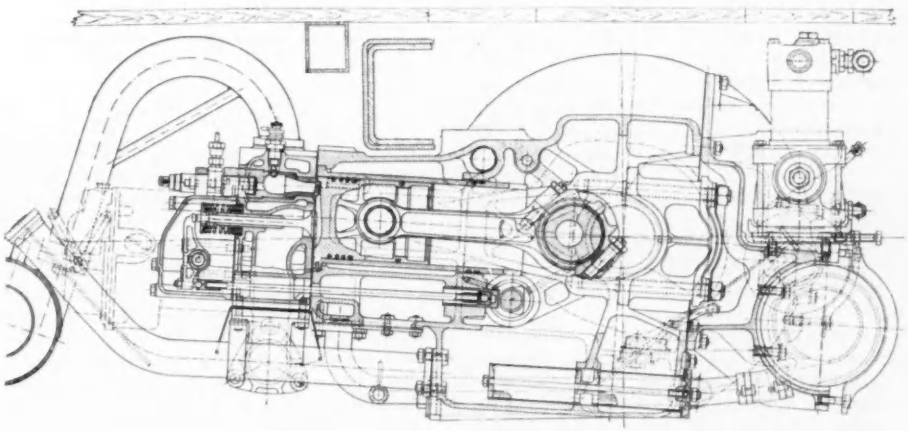


Transverse sectional view of the Bussing underfloor, six-cylinder Diesel engine.

New Engineering Developments

An array of new engineering developments, 22 technical sessions, engineering displays by 48 companies, and 60 some committee meetings comprised the main activities at the annual meeting of Society of Automotive Engineers during the week of January 14. As in past years, it was held in Detroit and the event this year attracted several thousand engineers and company executives, many of whom now are confronted with both Defense and civilian product problems.

It was generally agreed that up to the present time the supplies of materials had been adequate for automobile production and no drastic substitutions were necessary. Cars have not been affected structurally; only some decorative parts have suffered due to the shortage of nickel. Engineers expect the materials problem to become serious in 1952 despite production cutbacks, particularly copper and nickel. In their investigations most companies have found satisfactory changes for them, but higher costs and processing difficulties must be overcome.

In a paper on materials for jet powerplants, R. H. Thielemann, J. C. Mertz and W. P. Eddy, Jr., of Pratt & Whitney Aircraft Division, emphasized that large quantities of nickel, chromium, cobalt and tungsten would be required for jet engine production.

At the SAE business session Dr. Daniel P. Barnard IV was inducted as SAE president for 1952 and 12 vice presidents, who are listed on the next page, were installed, as was B. B. Bachman, re-elected treasurer. All had been elected by a mail vote of the membership. Six members of the SAE Council were installed, as follows:

1952 Term—E. F. Armstrong, General Motors of Canada, Ltd.; W. E. Beall, Boeing Airplane Co.; and R. F. Lyback, Esso Standard Oil Co.

1952-1953 Terms—Robert Cass, White Motor Co.; R. W. Goodale, Standard Oil Co. of California; and Herb Rawdon, Beech Aircraft Corp.

For the excellence of his paper, "Precombustion Reactions in a Motored Engine," which was presented at the SAE 1950 Summer Meeting, D. L. Pastell of E. I. duPont de Nemours & Co., was presented the 1950 Horning Memorial Award. Mr. Pastell supervises engine research on combustion at the duPont Petroleum Laboratory.

Dr. D. P. Barnard IV, president of the Society of Automotive Engineers for 1952, is Research Coordinator of the Standard Oil Co. (Indiana)

Before the meeting ended, plans were being made by SAE officers and members for the Summer Meeting, which is to be held at Atlantic City this year, June 1-6. Headquarters will be at the Ambassador and Ritz-Carlton hotels with the same pattern of program as was used at French Lick. Roundtable sessions will be continued during the afternoons.

Handling of technical papers of a highly analytical type was an innovation at the technical sessions. They were announced by title and made available in preprint form. The SAE Technical Board approved a revision of SAE specifications for transmission and axle greases to improve operation of motor vehicles, particularly at low temperature. A new viscosity grade designated as SAE 75 was added.

Featured at SAE Annual Meeting

By James R. Custer

SAE Officers for 1952

President
Dr. D. P. Barnard IV, Standard Oil Co. (Ind.)

Treasurer
B. B. Bachman, The Autocar Co.

Vice Presidents

Air Transport—A. W. Dallas, Air Transport Assn. of America;
Aircraft—D. Roy Shoults, General Electric Co.;
Aircraft Powerplant—F. C. Mock, Bendix Aviation Corp.;
Body—V. M. Exner, Chrysler Corp.;
Diesel Engine—W. G. Ainsley, Sinclair Research Laboratories, Inc.;
Engineering Materials—V. A. Crosby, Climax Molybdenum Co.;
Fuels & Lubricants—J. G. Moxey, Jr., Sun Oil Co.;
Passenger Car—H. E. Churchill, Studebaker Corp.;
Production—E. F. Gibian, Thompson Products, Inc.;
Tractor & Farm Machinery, C. A. Hubert, International Harvester Co.;
Transportation & Maintenance—Linn Edsall, Philadelphia Electric Co.;
Truck and Bus—F. W. Kateley, ACF-Brill Motors Co.

D. L. Pastell, research engineer for the E. I. du Pont deNemours & Co., is the winner of the SAE 1950 Horning Memorial Award.

New Engineering Developments

Several new engineering developments were described at the technical sessions. Power steering attracted considerable attention, including a large turnout to hear the excellent paper on that subject by W. K. Creson, Vice-President—Engineering, of the Ross Gear and Tool Co. Representatives of companies manufacturing and using power steering presented discussions afterward and reviewed the history of their developments. It was pointed out that the development of power steering in this country began in the latter part of the Twenties and although its adoption on passenger cars was interrupted by the depression, it has been used on heavy commercial and military vehicles since 1930. Bendix, Vickers, Gemmer and Ross exhibited at the annual meeting cutaway and demonstration models of their hydraulic power steering designs. Ross also displayed a cutaway model of the Garrison power steering and announced a licensing arrangement with the Garrison Manufacturing Co. of Los Angeles for further development and marketing of this hydraulic mechanism for trucks and passenger cars.

Another important development placed before the engineers was the Hi-Jet system for cooling and lubricating tools during machining operations. This revolutionary method was described in a paper presented by R. J. S. Pigott, Director, Engineering Division, Gulf Research & Development Co., and by A. T. Colwell, vice-president, Thompson Products, Inc. A de-

scription of the Hi-Jet system is given elsewhere in this article. For the marketing of this system Thompson has been licensed by Gulf to build the equipment and Gulf will make the Hi-Jet oil.

V. E. Yust of the Shell Oil Co. and E. A. Droegemueller of Pratt & Whitney Aircraft Division reported on their investigation of aviation spark plug fouling. Of the various materials tested, tricresyl phosphate was found to be extremely effective as a scavenger for use with tetraethyllead to minimize fouling. Compared to a conventional scavenger that gave a spark plug fouling time of four hours, tricresyl phosphate produced satisfactory operation of 62 hours with no evidence of fouling.

The results of some years of study as to the factors affecting the volumetric efficiency of four-stroke engines were presented in a comprehensive paper by J. C. Livengood, A. R. Rogowski and C. Fayette Taylor of the Sloan Laboratories for Automotive and Aircraft Engines at Massachusetts Institute of Technology. The authors developed the Gulp Factor, a critical design parameter, which is the inlet-valve Mach Index, and used it to make their analyses.

The progress that has been made with the shell molding method for ferrous castings at Auto Specialities Manufacturing Co. was described by H. L. Day. Shell molding is being applied there to the casting of crankshafts and valves. The new materials and processes for the Moraine-400 bearing, the Federal-Mogul high lead copper-lead bearing, and the General Motors Research slipper-type bearing for two-stroke Diesel connecting rods were of special interest and abstracts of the papers are presented with this article. The ball-joint front suspension developed by Thompson Products, Inc., and used on the 1952 Lincoln was analyzed by J. H. Booth of that company and E. S. MacPherson, chief engineer of the Ford Motor Co.

Some of the other recent engineering developments exhibited at the meeting are as follows:

Bendix—Treadle-Vac power brake unit and electronic ignition analyzer.

Vickers—Cartridge type shaft seals.

Aluminum Co. of America—Section type aluminum cylinder heads.

Auto Specialities Mfg. Co.—Disk type air brake for heavy duty vehicles.

Stewart-Warner—New electric fuel pump for trucks and buses.

Monroe Auto Equipment Co. — New copper steel radiator and safety brake device.

Zollner Machine Works—Bondoloc piston with double bonded Ni-Resist iron top ring groove section.

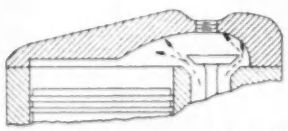
Abstracts of as many of the outstanding papers as space will permit are presented with this article and others will be published in future issues of AUTOMOTIVE INDUSTRIES.

Combustion Chamber Deposition and Power Loss

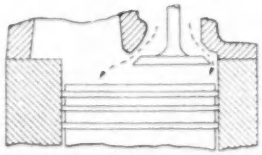
By H. J. Gibson, C. A. Hall, and A. E. Huffman, Ethyl Corp.

COMBUSTION chambers should be designed to minimize contact of the incoming charge with deposit-coated surfaces if power losses are to be held to a minimum. This is confirmed by analyses of test results obtained on commercial engines with different combustion chamber configurations. Fig. 1 illustrates some features of "Poor" and "Good" designs. The "Poor" design is a conventional L-head combustion chamber in which the surface-displacement ratio is high, and the position of the intake valve is such that the incoming charge scrubs large deposit-coated areas. The incoming charge is heated by this intimate contact with hot deposits and a reduction in volumetric efficiency results. In contrast is the "Good" design, a valve-in-head type which, although having a rather high surface displacement ratio of 0.92, has the intake valve so located that the incoming charge passes directly into the cylinder with a minimum of contact with deposit-coated surfaces. This type of design is excellent from the standpoint of power loss caused by deposits.

Although many considerations enter into combustion chamber design, deposit-power loss should be given adequate attention. It would seem possible to design chambers which are good in this respect without sacrificing other desirable qualities. This is particularly important in engines designed for applications in which power loss may be a problem.



"Poor" Design—High Power Loss. Intake valve position causes incoming charge to scrub relatively large areas of deposit-coated surfaces. Surface-displacement ratio is high.



"Good" Design—Low Power Loss. Intake valve position causes incoming charge to flow directly into the cylinder. Although the surface-displacement ratio of this design is high, a considerable portion of the deposit-coated surface is located so as to have minimum contact with incoming charge.

Fig. 1—Features of "poor" and "good" combustion chamber designs from standpoint of deposit-power loss.

Summary

1. Deposit-power loss in most engine applications is no greater than it was prior to World War II.
2. Fuel TEL concentration is not an important factor in engines used in passenger car and truck service, although in constant speed and load operation, deposit-power loss is related directly to TEL concentration.
3. There is probably little difference among the majority of commercial fuels and oils although fuel and oil composition can be shown to affect the magnitude of deposit- power loss.
4. Changes in engine design or engine operating conditions produce the largest effects. Since in most cases it is not practical to control operating conditions, engine design changes remain as the principal means of alleviating the problem where it occurs.
5. There is ample evidence that some

combustion chamber designs are far superior to others from the standpoint of deposit-power loss. Good design features provide for:

a. Introduction of the intake charge to the engine cylinder with minimum contact with deposit-coated surfaces
b. Low ratio of combustion chamber surface area to engine displacement
c. Adequate open areas adjacent to the intake valve so that deposit build-up will not cause physical restriction to flow of the incoming charge.

Practical Applications of Hi-Jet System

By A. T. Colwell, Vice President,
Thompson Products, Inc.

IN his conception of the Hi-Jet principle, Reg Pigott (Director, Engineering Division, Gulf Research and Development Co.) has produced a revolutionary advance in the art of removing metal and has done so in the most economical and easiest manner yet devised. Many attempts have been made to augment tool life or to use higher cutting speeds, and improvement has been derived through improved cutting oils and their application; but the greatest advance has been in the development of tool materials. The Hi-Jet method can now prolong the life of these improved materials in a new and novel manner.

Attempts to cool cutting tools are not new. Thompson Products conducted thorough exeperiments over a considerable period with carbon dioxide cooling. Our experimental work indicated that where cooling alone was paramount, CO_2 was beneficial, and it is being used today in the dry grinding of carbide tools. Other sources report that CO_2 has been used to some advantage in drilling and tapping operations to prevent seizing. However, our work with CO_2 in metal cutting showed that cooling alone is not the answer, as in some cases too much cooling increased the forces required for machining, and apparently some factor was lacking for increased tool life. Reg Pigott has shown that the combination of cooling plus oil vapor lubrication supplies the missing factor—with results far superior to anything we have to date experienced.

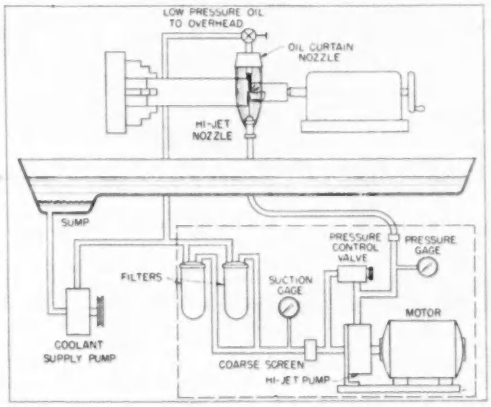


Fig. 1—Diagram of Hi-Jet system as installed. Oil curtain is provided from above to surround tool to absorb smoke and vapor. A small, high speed jet of oil is directed to the cutting tool edge by the lower nozzle.

Fig. 1 shows diagrammatically the present recommended arrangement of the Hi-Jet system for turning operations. The coolant supply pump on the machine is not disturbed, but the discharge flow is divided, most of it going to the overhead curtain and center flooding. The oil for the Hi-Jet system first passes through a commercial filter, two filters being manifolded together in parallel. The filter cartridges can be replaced in a few minutes when the pump suction gage indicates they are approaching a plugged condition—the cartridges will operate approximately two weeks, depending upon conditions. A fine-mesh screen is located ahead of the pump to prevent metal particles from entering the system while the filter cartridges are being replaced.

The Hi-Jet pumps used to date have been the gear or vane type, with pressures of 400 to 600 psi at a flow of 1 gpm. Since each jet flows only about 1/10 gpm, this size pump is ample even for long cutting edge form tools requiring 5 or more jets. Which proves once more that it takes only a little oil in the right place and proper phase to do a job. For Hi-Jet production units, an internal gear pump developed by Mr. Pigott appears to have excellent properties for this installation.

The elements enclosed within the dashed lines on Fig. 1 have been designed by Thompson Products into a package unit. A simple plumbing job and electrical connections to the motor complete this portion of the installation.

A line of nozzles and nozzle holders has also been designed for flexibility in adapting to the widely used types of production lathes. Obviously there will be many special designs required as the use of the Hi-Jet system widens.

The nozzle itself consists of a body incorporating a fine screen, and a screwed cap to hold and seal a flat plate into which are drilled the jet holes, ranging in diameter from .010 to .020. Development work is being conducted using plates having as many as 13 jet holes.

Production experience has proved the effectiveness of Hi-Jet in increasing tool life on tough aircraft TPM exhaust valve alloy. The increase is substantial —350 per cent conservatively. By proper design, down time can be decreased appreciably, tool inventory cut, regrinding time reduced, and time to tool failure more accurately predicted. Hi-Jet should have wide application on long production runs for both medium alloy and high alloy steels. With Hi-Jet, cutting speed can be increased at a specific tool life by speeding up the machine. As an example, for HSS and a tool life of 60 minutes, cutting speed can be increased 45 per cent with Hi-Jet when turning SAE 1045.

Some problems must be solved in applying Hi-Jet to turret lathes—for instance, an indexing valve must be designed to feed the nozzle on each tool. Feeding cross slide nozzles is comparatively simple.

Complicated form tools often have a definite spot which fails first. Proper use of Hi-Jet, applying a little vapor to the weak spot, may extend tool life several times.

Hardness, Elastic Modulus and Wear of Metals

By T. L. Oberle,
Staff Metallurgist
Caterpillar Tractor Co.

EVIDENCE shows that the wear of engineering materials is closely related to the elastic limit of strain. The Brinell hardness multiplied by 10^6 and divided by the elastic modulus is called Modell and is proposed as a practical measure of

Material	Condition	E	Brinell	Modell
Alundum (AL_2O_3)	Bonded	14,000,000	2000	143
Chrome Plate	Bright	12,000,000	1000	83
Gray Iron	Hard	15,000,000	500	33
Tungsten Carbide	9% Cobalt	81,000,000	1800	22
Steel	Hard	29,000,000	600	21
Titanium	Hard	17,500,000	300	17
Aluminum Alloy	Hard	10,500,000	120	11
Gray Iron	As Cast	15,000,000	150	10
Structural Steel	Soft	30,000,000	150	5
Malleable Iron	Soft	25,000,000	125	5
Wrought Iron	Soft	29,000,000	100	3.5
Chromium Metal	As Cast	36,000,000	125	3.5
Copper	Soft	16,000,000	40	2.5
Silver	Pure	11,000,000	25	2.3
Aluminum	Pure	10,000,000	20	2.0
Lead	Pure	2,000,000	4	2.0
Tin	Pure	6,000,000	4	0.7

TABLE I—Modell Values for Various Materials

Metal	Micro-Structure	Graphite Volume %	E X 10^{-6}	Brinell	Modell
Steel	Pearlite	0	29	200	6.9
Malleable Iron	Pearlite	10	26	200	7.7
Gray Iron	Pearlite	10	12	200	16.7

TABLE II—Elastic Properties of Steel, Malleable Iron and Gray Iron

the elastic limit of strain. Materials are listed in Table I in order of decreasing Modell. Modell gives an indication of the depth of penetration that a metal can tolerate without exceeding its elastic limit. Chromium plate will recover elastically from more than 100 times the amount of deformation that will cause tin to plastically yield. Materials of high Modell behave like a spring, absorbing energy and preventing loads from building up to a high value.

Higher Modell values can be obtained by increasing hardness or decreasing elastic modulus or by doing both. Since methods of increasing hardness have been thoroughly explored, greatest gains appear in the direction of lowering the elastic modulus of materials. The introduction of interruptions to the continuity of a material and the control of crystal orientation to produce low surface modulus in the proper direction are the two most likely means of altering elastic modulus to create high Modell materials of the future. Research directed toward controlling the elastic modulus of metals should be greatly accelerated.

The success of gray iron in resisting engine wear is attributed by some engineers to the lubricating qualities of the graphite present. Yet, malleable iron containing the same amount of graphite as gray iron cannot be substituted successfully for gray iron in many engine parts. Table II illustrates some real differences in elastic properties between malleable iron and gray iron that exist as a result of the shape or form of the graphite particle independently of the graphite volume.

The difference in Modell values alone is sufficient to account for superior running qualities of gray iron. Gray irons containing finely dispersed dendritic graphite may have elastic modulus values as high as malleable iron, so that more knowledge than just that the iron was cast gray is necessary to judge the suitability of the material for frictional applications.

Wear increasing as hardness increases is contrary to expectation. This reversal of the usual trend is the result of the sharply increasing modulus that occurs simultaneously with the hardness increase. For most materials, the elastic modulus is unchanged during hardening and its influence is not felt. Data on alloyed irons confirm these trends. Data from various sources indicate that for wear applications, gray iron should be cast with coarse graphite flakes and hardened by heat treatment to produce maximum Modell, rather than obtain high hardness in an as-cast, high-strength iron with resultant high elastic modulus.

Outstanding wear results have been observed with the use of some materials normally considered abrasive. Tests conducted at the Caterpillar Research Laboratory have shown Al_2O_3 cylinder liners to possess excellent wear resistance. In addition to freedom from liner wear the wear rate of piston rings is greatly reduced. With economical methods of manufacture of Al_2O_3 wearing surfaces this material may become as commonplace for engine and tractor parts as semi-precious jewel mountings have for timepieces.

Slipper Type Bearings for Two-Stroke Diesel Connecting Rods

By Arthur F. Underwood and Arvid E. Roach,
Research Laboratories Div., General Motors

SILVER had been employed as a bearing material for several years, but it had been found to require a thin lead-tin overlay to give satisfactory frictional qualities. With the slipper bearing operating under high loads, it was thought that this lead-tin overlay would wear away and permit scoring of the silver. The grid-type bearing had already been developed, and it appeared that a bearing of this construction would satisfy the requirements as regards fatigue strength, score resistance, and embedability, providing that means could be found of attaching the bearing to the slipper end of the connecting rod.

The problem of bonding the silver grid bearing to the rod was complicated by the requirements for heat treating the rod. The first method of bonding employed in production was to apply a pad of 0.050-in. pure silver to the end of the rod by silver soldering in a hydrogen brazing furnace. The sliver pad was held in contact with the rod during soldering by a die loaded with tubular springs. During soldering, the entire connecting rod was heated above the critical temperateure of the steel. When the rod was removed from the furnace, it was quenched to harden the steel. By

(*Turn to page* 110, *please*)

De Soto Fire Dome V-8 four-door sedan.

De Soto S-17

Custom Line features

160-Hp V-8 Engine

SUPPLEMENTING its earlier announcement of six-cylinder 1952 De Soto S-15 models De Soto Division, Chrysler Corp., has released the details of the S-17 Custom line of cars, featuring the new 160-hp V-8 engine which was described in the February 1 issue of AUTOMOTIVE INDUSTRIES. Packed with noteworthy features, the S-17 line also will offer as optional equipment the new hydraulic power steering gear as well as torque converter drive.

The S-17, Fire Dome 8 line includes the following models: Four-door sedan; club coupe, convertible coupe, special club coupe "Sportsman"; and an all-steel station wagon.

Front end styling is distinguished by the introduction of a new hood, new hood ornament, and hood medallion. The hood ornament is mounted atop a grilled opening, providing a source of cooler air for the carburetor intake.

From the standpoint of mechanical features, easily the most important is the introduction of the high performance V-8 which boasts a bhp/cu in. ratio of 0.579, said to be the highest of any automobile engine now on the U. S. market. Other features of this outstanding engine are described separately as noted above. It may be noted that a new fixed shunt type oil filter will be standard equipment on all S-17 models. Of improved by-pass type, it delivers filtered oil directly to the engine galleries. It is interchangeable with the full-flow filter which will be available as optional equipment at extra cost.

A larger rear axle with a four-pinion type differential is employed with the V-8 engine to handle the increased torque. Decreased tooth loading, reduced deflections, and larger diameter ring gear all are conducive to longer life.

This year De Soto offers the owner a choice among four different types of drives. A three-speed synchromesh transmission with conventional flywheel is standard equipment. The well-known "Tip-Toe" shift with fluid drive (the M-6 transmission with fluid coupling) will be available as special equipment. In addition, there is an option of overdrive in combination

(*Turn to page* 108, *please*)

Almost

300 Ton-Miles per Gallon With Two-Stroke Diesel

By Prof. Dr.-Ing. F. Sass, Berlin, Germany
and
P. H. Schweitzer, State College, Pa.

THIS is the story of a successful two-stroke cycle, loop-scavenged Diesel engine recently developed for road vehicles.

It took a long time for the loop-scavenged engine to break into the automotive field. The reason for this may be found in the difficulty the scavenging offers under rotative speeds required by road vehicles. It is difficult so to direct the scavenging air stream that it cleans out the entire cylinder without dissolving into wasteful chaotic turbulence.

The uniflow scavenging gets around this difficulty as it guides the air stream in a straight line through the cylinder and permits a thorough cleaning of it. However, simplicity is being sacrified because uniflow scavenging requires either opposed pistons, or poppet valves, or sleeve valves.

A simple, economical engine has been developed by the noted inventor, Adolf Schnürle (died May 24, 1951), the designer of the Krauss-Maffei engine. To realize a loop or reverse scavenging, Schnürle placed the inlet ports on both sides of the exhaust ports, so that the incoming air enters in two streams uniting on the opposite cylinder wall, flows upward, turns under the cylinder head and then flows downward on the entry side. So the air flow is guided through its entire journey by solid surfaces. This guidance permits an orderly flow at almost any piston speed. All ports are controlled by the top edge of the piston, without any other means of control.

Figure 1 shows what the engine looks like and Fig. 2, its longitudinal and transverse sections. In four cylinders (4¾ by 5⅛ in.) it develops 145 continuous net hp at 2200 rpm, and at 2300 rpm it pulls 160 hp intermittently. The overall dimensions are 35 in. long, 36 in.

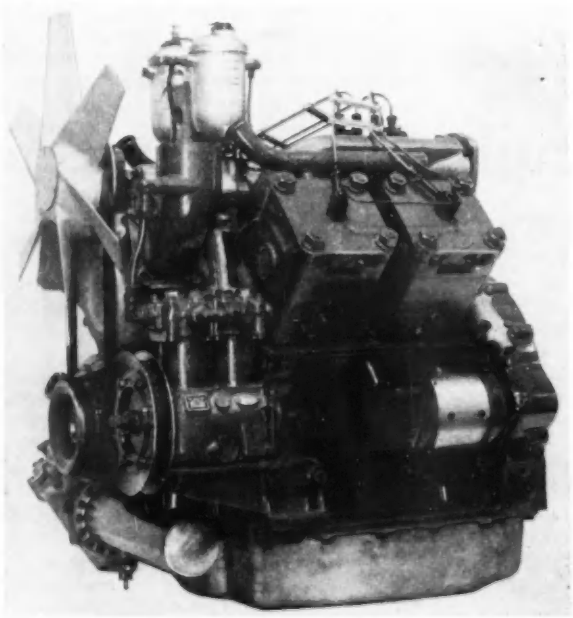


FIG. 1

Krauss-Maffei engine Type KMD6. Continuous output 145 bhp at 2200 rpm.

**LONGITUDINAL SECTION—
KRAUSS-MAFFEI ENGINE**

wide, and 44 in. high, weighs with standard accessories 1579 lb or 10.9 lb/hp. The four cylinders are arranged in 90-deg vee, which gives equally spaced firings.

The engine mechanism consists essentially of the double throw crankshaft, four connecting rods and four pistons, plus a few gears for driving the injection pump, blower, and other accessories. These are about the only moving parts. The cylinders have the injection valves centrally located in the cylinder head.

The four-cylinder vee arrangement not only allows a very compact construction, but it also results in a good balance. The rotative part of the masses is completely balanced by a counterweight on the belt pulley at the blower end and a cavity in the flywheel on the opposite end. Of the reciprocating inertia forces, the forces of the first order and the couples of the first and second order are balanced. Second order forces cannot be balanced, and they tend to oscillate the engine in the horizontal plane at right angle to the longitudinal axis. But, since the natural frequency of the frame is way below the frequency of these inertia forces (twice engine rpm), this unbalance does not result in noticeable vehicle vibrations, as the authors had occasion to observe in extended road tests.

The crankcase is a one-piece iron casting to which an aluminum oil pan is attached. The two upper surfaces inclined at 45 deg accommodate the cylinders, each of which is held with four large studs which also hold the cylinder head and transmit the combustion pressures into the well-ribbed crankcase. The upper portion of the crankcase serves as the airbox or scavenging receiver, closed with a cast cover which carries the injection pump. To the front the aluminum blower casing is attached, the diffuser of which connects with the airbox. The cast aluminum blower impeller is shown in Fig. 4.

The crankshaft is husky and short, and has the crank cheeks in one plane. No counterweights are used, but one of the crank cheeks carries a gear for the accessory drives. All this results in a very short engine in spite of the generous center distance (1.85 x bore) between cylinders.

The cylinders are individual castings

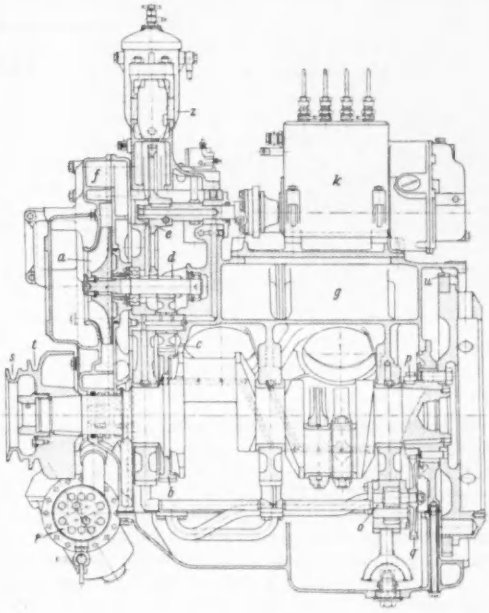
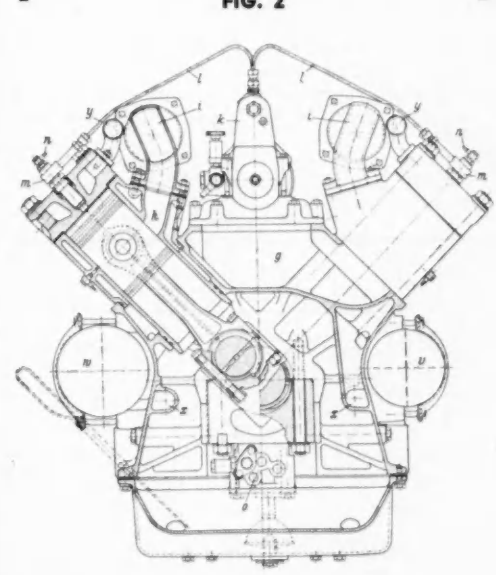


FIG. 2

In both illustrations—a is the impeller of centrifugal blower, b gear on crankshaft, c intermediate gear, d spline for driving impeller, e gear for driving injection pump, f diffusor of blower, g airbox, h exhaust ports, i exhaust manifolds, k injection pump, l injection lines, o lubricating pump, p, q, gears for driving lubricating pump, r oil cooler, s key for driving brake air compressor, u gear for starter, v starter, w generator, x cooling water entry, y cooling water discharge pipes, z fuel filter.

FIG. 2



**TRANSVERSE SECTION—
KRAUSS-MAFFEI ENGINE**

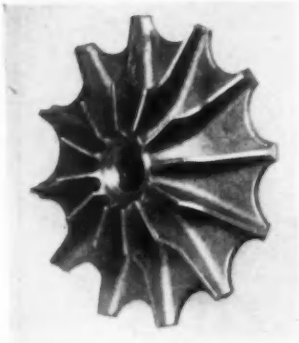
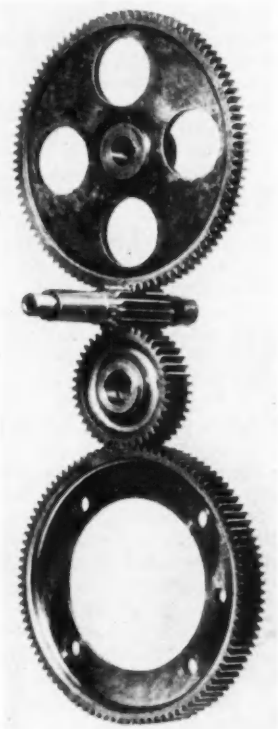


FIG. 4
Blower impeller.

FIG. 3
Gears for blower and injection pump drive.



provided with integral cooling jackets. The lower part of the cooling jacket is formed by the crankcase. Both air and water enter the cylinders through their bottom seats.

A strong advantage of the loop-scavenged engine is the extraordinarily simple cylinder head. It is made of silicon-aluminum in a strikingly simple shape, and contains a cavity for the coolant and a central hole for the injector and nothing more. The combustion space is formed by a shallow cavity in the cast iron piston. The injection pump, driven by the top gear shown in Fig. 3, is provided with automatic injection timing adjuster, which retards injection begun by eight crank deg during starting and slow idling (500 rpm).

The pistons are splash-lubricated, but the cylinder walls receive additional lubrication from a fine metering plunger pump through a small drilled hole in the cylinder wall. This pump is driven through helical gears from the injection pump shaft and so controlled by the control rack that the metered quantity increases with the load.

An engine was subjected to a thorough investigation on the manufacturer's test stand; another mounted on a heavily loaded bus chassis went through extended road tests. All laboratory and road tests were continuously supervised by the authors and their associates, two experienced engine experts. The test results are presented her as they were recorded by the authors and their associates.

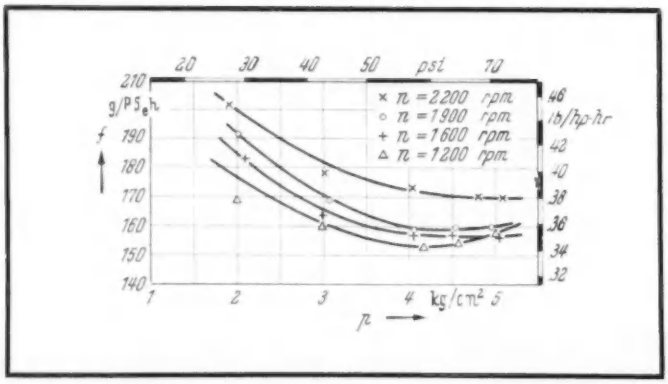
Complete measurements were made with calibrated instruments. The power output was measured by a water dynamometer, the fuel consumption by clocking the time tor 250 cc fuel to flow through a burette. Air consumption was measured by a standard thin plate orifice and an inclined manometer.

The cooling water passing the engine was determined by temporarily diverting it into a tank and clocking the time needed to draw 10 kg water.

Commercial German Diesel fuel was used with 0.839 specific gravity, 221 F flash, 54.7 cetane number, and lower heating value of 18,450 Btu/lb.

Graph sheets, Figs. 6 to 13,

FIG. 7
Fuel consumption vs. bmep.



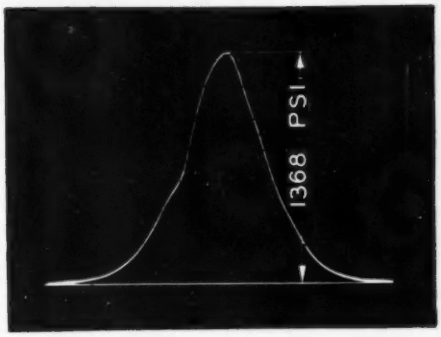


FIG. 8

Indicator diagram, rated load.

show the most important test results.

Figure 7 shows power output, torque, bmep and specific fuel consumption plotted against rpm. At loads corresponding to test points marked with circles the exhaust of the engine was clear to visual observation. The curves, marked with crosses, indicate such overload at which exhaust discoloration begins, but the engine could run at this load for a long period without sooting up.

In Fig. 6 the characteristic curves of the engine are shown. The region of optimum fuel consumption is between 1200 and 1600 rpm and between 57 and 67 bmep. At 1265 rpm and 59.1 bmep the authors have reliably measured 0.343 lb/bhp-hr and at 1250 rpm and 64.8 bmep, 0.347 lb/bhp-hr. These figures are uncorrected for barometer and temperature. The metric figures were 153 and 155 grams/PS$_e$h and in the above conversion they were reduced corresponding to the 1.4 per cent smaller metric horsepower. These are values which can hardly be improved on with engines of this size, two or four-stroke cycle. In the wide speed range between 1200 and 1900 rpm and with loads between 40 and 70 bmep the fuel consumption never exceeded 0.36 lb/bhp-hr.

The characteristic may also be viewed as a three-dimensional diagram of which the third ordinate is the specific consumption f. If we intersect this three-dimensional diagram at 1200, 1600, 1900 and 2200 rpm we obtain the consumption curves of Fig. 7 as a function at bmep shown at these four speeds. Even at the relatively high bmep of 71 psi the specific fuel consumption does not exceed 0.359 lb/bhp-hr between 1200 and 1900 rpm.

Two cylinder heads were provided with indicator holes into which the quartz pickups of a piezo-electric indicator were mounted. Figure 8 shows a photographically recorded diagram. For calibration, the indicator was connected to a pressure chamber. When this chamber was gradually filled with air from a bottle the diagram peak on the scope sank, and with sufficiently high back pressure it disappeared completely and remained only the glowing base line. The pressure read on the control pressure gage in this instant was equal to the firing pressure. With this method at 71 bmep load the following pressures were measured:

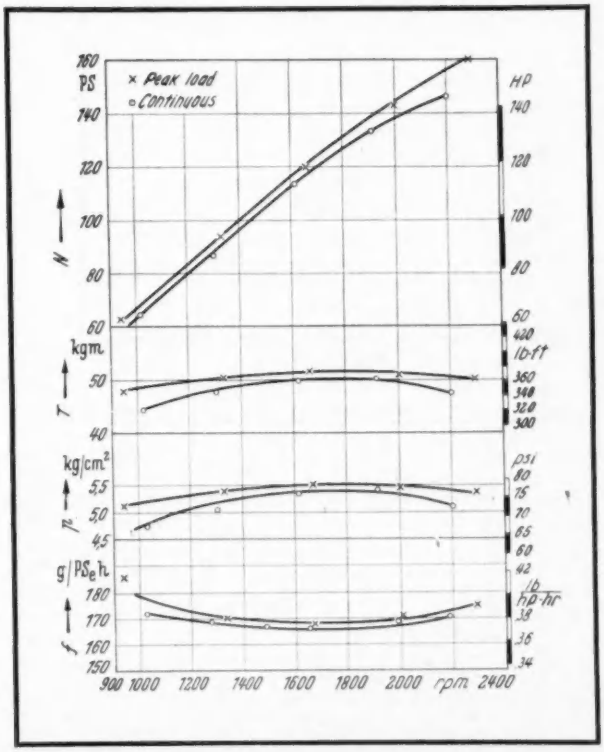


FIG. 5

Power output N, Torque T, bmep p, and specific fuel consumption f vs. rpm.

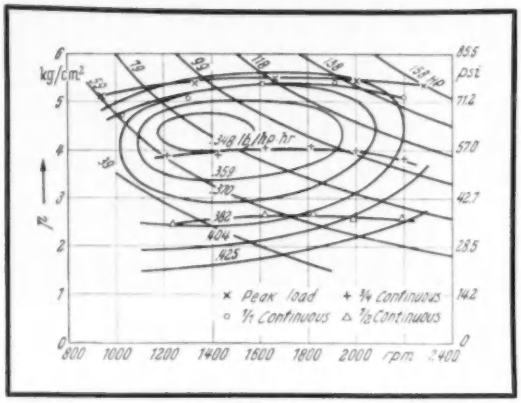


FIG. 6

Characteristic curves.

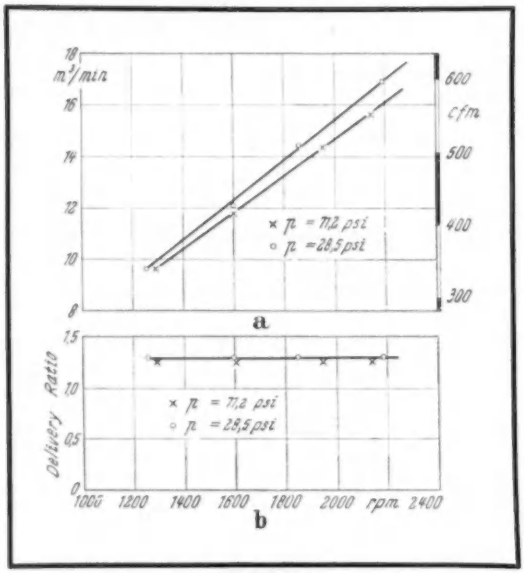


FIGURE 9

Air consumption (a) and delivery ratio (b) vs. rpm.

Ton-Miles with Two-Stroke

Rpm	Output hp	Compression Pressure psig	Firing Pressure psig
1255	78	595	1224
1735	113.2	684	1324
2180	142	710	1368

For the very strongly built crankshaft these pressures are by no means too high.

Another point of interest was the determination of the air quantities and the delivery ratio, or the volume of free air sucked by the blower per stroke divided by the displacement volume. According to Fig. 9 the air consumption increases linearly with the engine speed, and the delivery ratio was almost independent of the load and practically constant and equal 1.3.

Since all the air the blower delivers goes through the engine and the inlet pressure to the centrifugal blower is substantially atmospheric, paradoxically the lower its discharge pressure (equal airbox pressure), for any one speed, the greater the air flow. The airbox pressures were at:

960	1520	2060	2200 rpm
0.71	1.7	3.15	3.7 psig

These pressures are unusually low, as compared to those usually found in small, high-speed, two-stroke cycle engines. These low airbox pressures are responsible for the small parasitic horsepower absorbed by the blower. Every pound increase in airbox pressure reduces the net bmep of the engine by approximately two psi, therefore, if good scavenging is accomplished by low airbox pressures the power output and fuel economy must improve.

There is a widespread belief among engineers

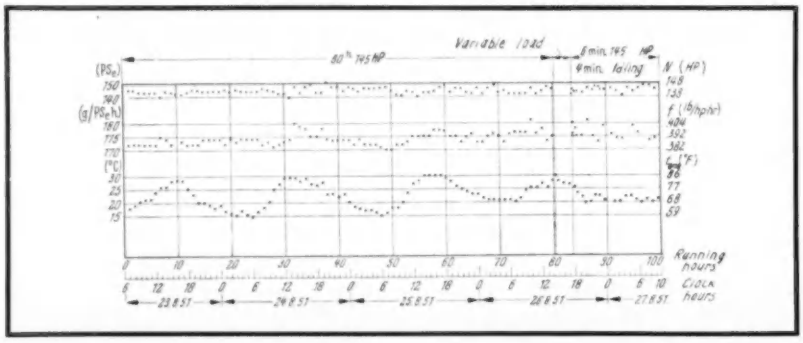


FIG. 10

Power output, specific fuel consumption and room temperature during a continuous 100-hour run.

that a geared centrifugal blower is unsuitable for charging a two-stroke cycle engine because it would not deliver enough air at low speed. *This is a fallacy.* The characteristics of a well-designed centrifugal blower match the requirements of the two-stroke cycle engine perfectly, producing an equally good filling at low speed as at high speed.

At 64 bmep the heat rejected to the cooling water was at

72	100	127	bhp
52,250	70,000	89,100	Btu/hr
7,260	7,000	7,020	Btu/hp-hr

The cooling was more than adequate at all loads.

After completing the individual tests that took several days, the engine, without cleaning or overhauling, was subjected to a 100-hour continuous test at 142 bhp and 2200 rpm, which were kept as constant as possible. During the entire period, the engine was under uninterrupted and unbiased supervision. Of the hourly readings in Fig. 10 only power, fuel consumption, and room temperature are recorded. The influence of room temperature upon fuel consumption is noticeable. The average fuel consumption was 0.390 lb/bhp-hr. In spite of a light sooting up of the exhaust ports, after completion of the 100-hour run, no decrease in output or increase in fuel consumption was observed.

This was also checked by intermediate tests inserted after 80 hours without stopping the engine. The results shown in Fig. 11 practically

(*Turn to page* 126, *please*)

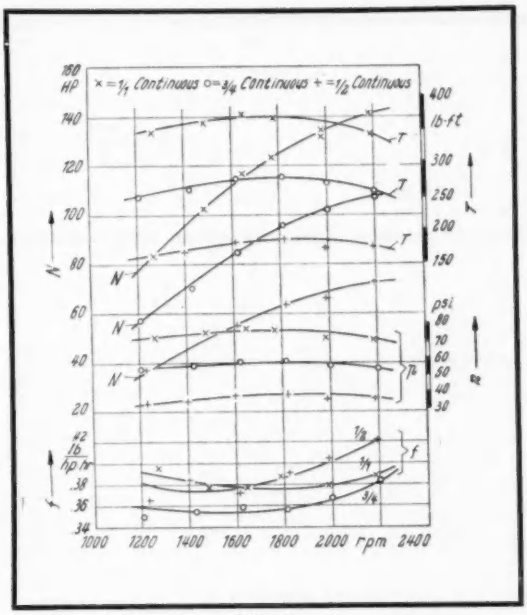


FIG. 11

Power output, torque, bmep, and specific fuel consumption for full, ¾, and ½ load, taken during the 100-hour run after 80 hours.

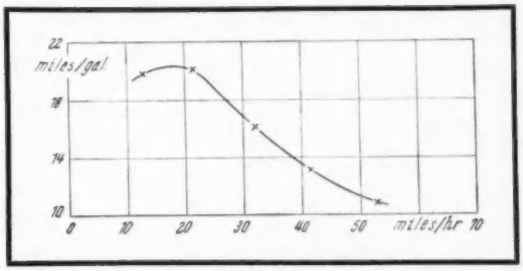


FIG. 12

Fuel consumption of bus weighing 29,210 lb vs vehicle speed.

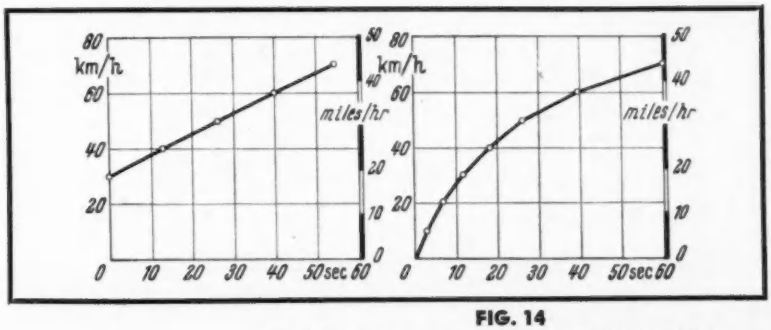


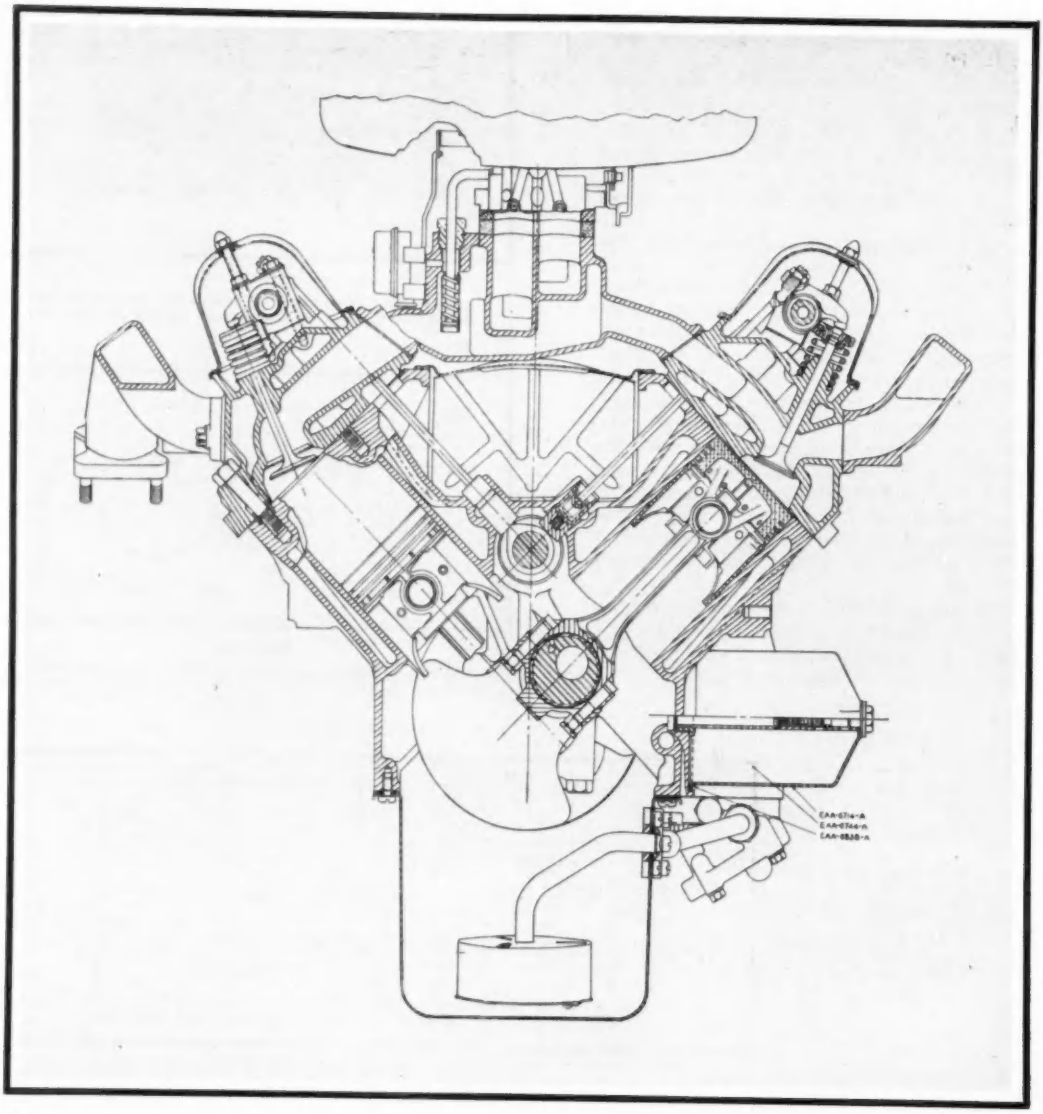
FIG. 13

(Near chart, at right)—Acceleration times of vehicle (29,210 lb) in 6th gear.

FIG. 14

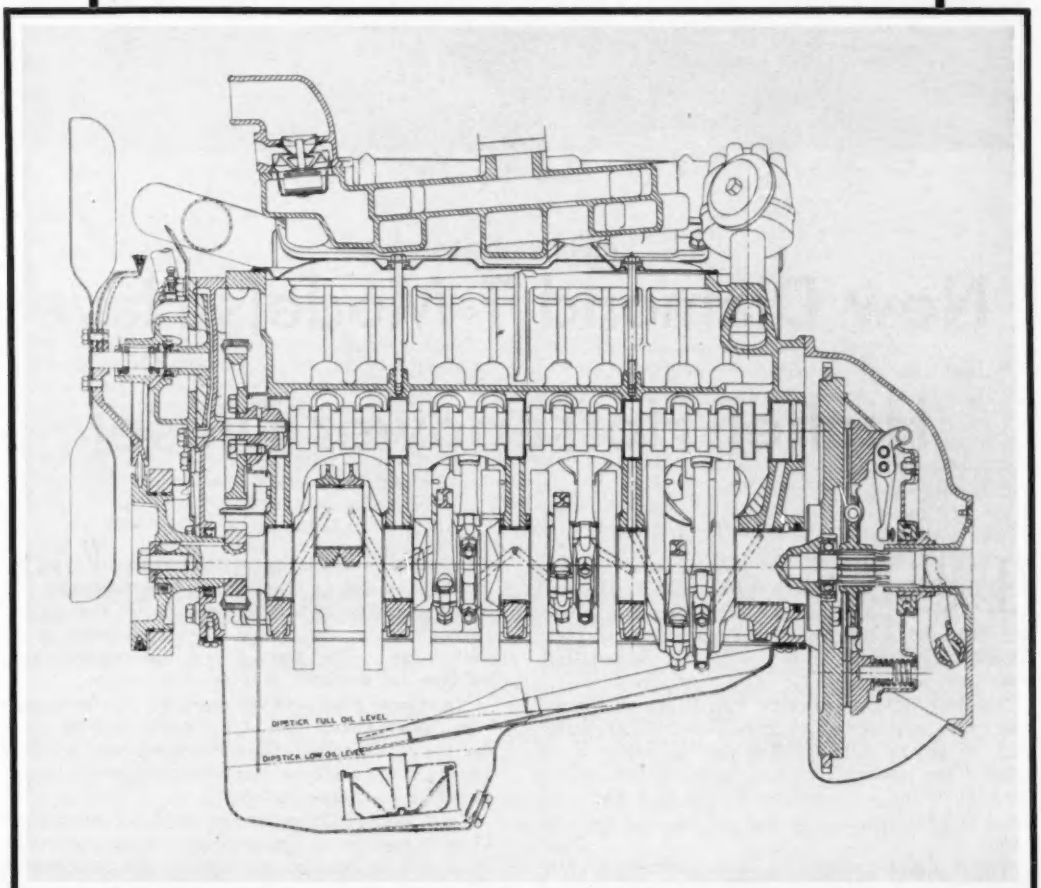
(Right)—Acceleration times of vehicle (29,210 lb) by shifting gears.

The 1952



Lincoln Engine

SHOWN here are transverse and longitudinal views of the 1952 overhead-valve, V-8 Lincoln engine which was described in the January 15 issue of AUTOMOTIVE INDUSTRIES, page 34. Note that the crankcase extends well below the main bearings to provide a flat, continuous surface for the oilpan gasket, also that the cylinder heads have been designed to raise the valve cover gasket above oil which collects in the compartment. Among the other features illustrated are newly-designed connecting rods, overhead-valve mechanism with valve stems guided in bores directly in the cylinder heads, and full-flow oil filter mounted on the crankcase.



Diamond T Model 951RS

New Diamond T Models Have Higher Horsepower Diesel

THE new Models 950 and 951, latest additions to the line of heavy-duty trucks built by Diamond T Motor Car Co., are the largest and most powerful ever built by the company for commercial us. Their Diesel engines range up to 300 hp, and tandem-drive rear axles are optional for extra-heavy loads.

The 950 Series is powered with Cummins Diesels, and options include the 200 hp NHB, the 275 hp NHBS and the 300 hp NHRBS. For the 951 Series, Buda Diesels are employed, with a choice of the 215 hp 6DA844 or the supercharged 280 hp 6DAS844. All other specifications and options are identical for both series.

The standard transmission is the extra-heavy duty Fuller 10-speed, with two overdrives. Rear axles must be specified to match the specific service. All types are available, including bevel, double-reduction, and two-speed variations of both designs. In the majority of cases, however, the tandem drive six-wheeler is required, and both Timken and Eaton-Hendrickson tandems are available in Models 950 and 951.

Manganese alloy steel is employed for frame side rails, which are of 5/16 in. stock and 10⅛ in. depth for their full length. Channel inner-liners and fish-plates provide additional reinforcement for long wheelbase frame and six-wheelers.

These 950 and 951 models are designed for maximum highway loads in the inter-mountain states and Pacific coast, and for logging, the oil-fields, and other severe off-highway operations in all parts of the country.

Bhp/ cu in. Comparison
Selected 1952 Passenger Car Engines

Make	Type	Displacement (cu in.)	Bhp (max.)	Compression Ratio	Bhp/cu in.
De Soto	V-8	276	160	7.1 to 1	0.579
Cadillac	V-8	331	190	7.5 to 1	0.574
Willys	F-head 6	161	90	7.6 to 1	0.559
Chrysler	V-8	331	180	7.5 to 1	0.544
Buick	In-line 8	320.2	170	7.5 to 1	0.530
Oldsmobile	V-8	303.7	160	7.5 to 1	0.526
Studebaker	V-8	232.6	120	7 to 1	0.516
Lincoln	V-8	317.5	160	7.5 to 1	0.504
Mercury	V-8	255.4	125	7.2 to 1	0.489
Hudson-Hornet	L-head 6	308	145	7.2 to 1	0.470
Ford	OHV-6	215.3	101	7 to 1	0.468

The Horsepower Race

By Joseph Geschelin

ONE of the interesting phenomena of the 1952 passenger car announcement season has been the emergence of a significant number of new high performance engines. Apart from the Ford overhead valve Six and the Willys F-head conversion of the familiar Willys six-cyl, L-head engine, the trend has been unmistakably to the overhead valve 90-deg type V-8. There is little question that the latter type will be extended throughout the industry since it is general knowledge that Dodge has completed much of its tooling and both Buick and Pontiac have pretty well decided upon V-8's of their own unique design.

The versatility of the new V-8 engines is really amazing, judging by what has been done this season by Cadillac and Oldsmobile in boosting output by major percentages without changing basic specifications.

Another striking development this year is found in what may be termed the battle of the V-8's in advertised horsepower ratings. Unquestionably, Chrysler started the ball rolling with the introduction of its 331-cu in. V-8 last season with an advertised rating of 180 bhp. Up to that time the 160-hp Cadillac had the highest rated output of stock passenger car engines. Meeting this challenge, Cadillac now has boosted output to a big 190 bhp; Buick with 170 bph for the Roadmaster. At the same time Oldsmobile, Lincoln, and De Soto have emerged with engines rated at 160 bph.

In tabular form, the writer has listed some basic data on a selected group of new engines, also including Buick, Hudson, Mercury, and Willys. Buick marks a higher output adaptation of the familiar overhead valve in-line Eight; the Mercury represents the basic L-head V-8; while Willys is an F-head adaptation of the time-honored Willys L-head Six.

In the competition of new engines, particularly of the high performance overhead valve V-8's, one criterion emerges as a possible measure of the effectiveness of design and performance characteristics. We refer to the factor of bhp cu in. displacement. The engines listed on the table have been arranged in a descending order of this criterion. It will be noted that the De Soto with a ratio of 0.579 heads the list. The median value is 0.526.

It is also noteworthy that compression ratio is comparatively moderate, judged by discussion in recent years, doubtless in deference to current economic conditions which definitely dictate lower octane ratings for both regular and premium fuels. Five of the ten engines have a compression ratio of 7.5 to 1; only Willys is 7.6 to 1; while the remaining four makes

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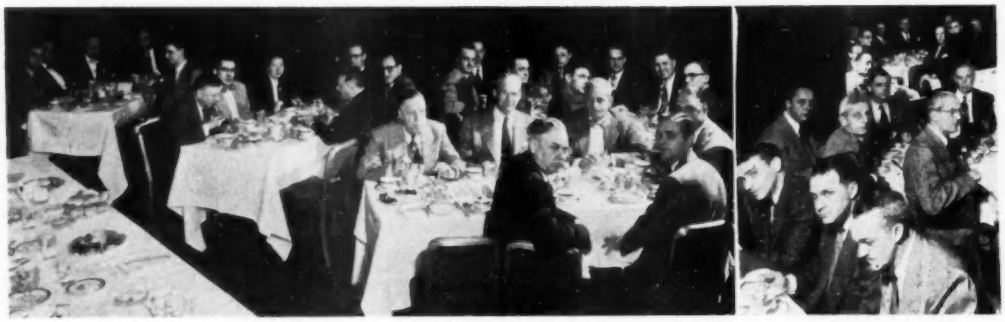

Detroit and Dayton Renegotiation

CONTINUING the management conferences on Defense contract renegotiation, regional meetings were held early in January at Dayton and Detroit under the auspices of AUTOMOTIVE INDUSTRIES. There were large turnouts of key executives at the two sessions, which featured talks by Kenneth G. Smith, renegotiation consultant, followed by lively discussions of the various problems in the preparation of renegotiation reports. Previous meetings held at Philadelphia, Hartford, Buffalo, Cleveland, Cincinnati and Pittsburgh were reviewed in the October 15, December 1, 1951, and January 1 issues of AUTOMOTIVE INDUSTRIES.

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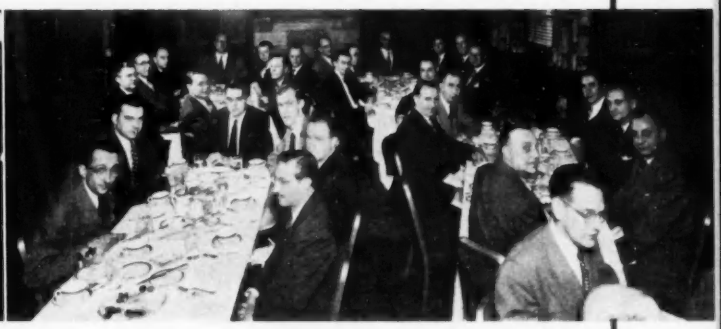

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French Gas Turbine Truck Has Two Free-Piston Engines

By W. F. Bradley
Special European Correspondent
for AUTOMOTIVE INDUSTRIES

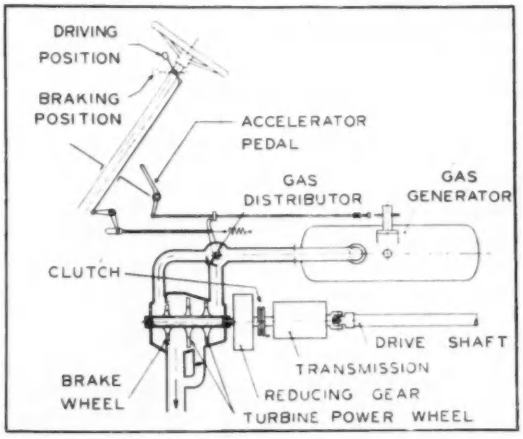
PARIS, FRANCE

DESIGNS for a gas turbine truck of 10 to 15 tons load capacity—total weight 18 tons—were recently revealed before the members of the SIA (French Society of Automotive Engineers) by Robert Huber, who is chief engineer of the Société d'Etudes Mécaniques et Energétiques. This power plant features the use of the free piston type of engine as originally laid out by Pescara which has been developed by this society and is in use for a number of generating stations and on ships. Most of these power plants develop about 1000 hp.

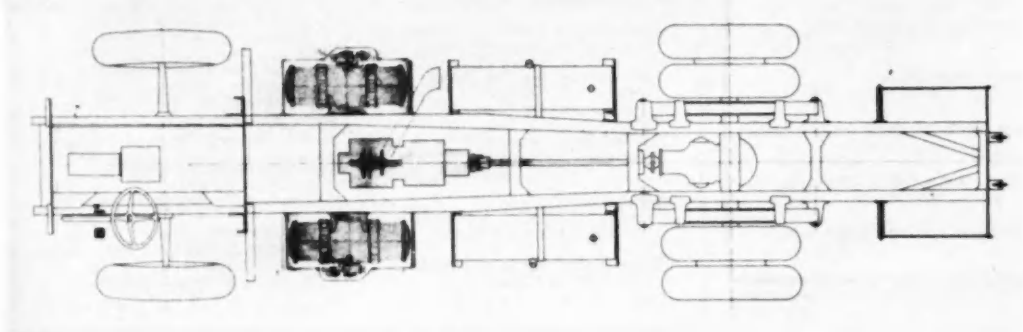
For truck service use is made of two free-piston engines, each of 120 hp, feeding a two stage turbine. While the design provides considerable liberty in the positioning of the engines, an advantageous position is outside the frame members, with the turbine centrally mounted in the frame, driving through a reducing gear, a transmission, and an open propeller shaft to a standard type rear axle. Each of the generators has a bore of 4.72 in., with a length of 47 in. and a diam of 13.7 in. Weight of each generator is 550 lb. The number of pulsations is 1870 per minute. Operating at full load, the pressure of the gas obtained from the generators is 56.9 psi effective, temperature 570 C, and weight of gas per generator 380 gm sec.

(*Turn to page* 106, *please*)

Schematic diagram of controls and units of free-piston gas turbine.



General arrangement of free-piston engines, gas turbine, transmission, etc., in truck chassis.



Its scientifically designed, raised-lug pattern provides positive traction from every direction.
Can be sheared, welded, punched, flame cut, shaped!
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Wherever safe footing is important, American industry specifies
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Made of steel, it will stand up for years under tough abuse!
Its pattern is easy to match from any direction.
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The BUSINESS PULSE

Better Balance Has Been Achieved Between Stocks of Durable and Non-Durable Goods. Inflationary Implications Apparent in Mr. Truman's Federal Economic Program for Coming Year. Cut Needed in New Federal Spending.

Inventory Adjustment

The general level of business, while still high, appears to be moderately below that of a year ago. Incoming data on retail trade compare unfavorably with statistics for the same period of last year, while reports from wholesale markets reveal that buying activity is characterized by a high degree of selectivity. Many observers interpret the lagging trade in some lines as an indication that the process of inventory adjustment is continuing. Wholesale prices, which were fairly stable in the autumn period, have shown a mild downward tendency for the past few weeks, suggesting that the balance of forces may again be on the deflationary side. The shortage of steel scrap is apparently still widely felt, although improvement has been reported from some areas in recent weeks. The steel-wage problem has not yet been resolved, and the outlook for a peaceful settlement is overcast with uncertainty. No immediate solution is in sight for the serious unemployment which has developed in Detroit and some other areas as a result of ordered cutbacks in civilian production.

This Survey is Prepared Exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Company of New York.

Several of these factors, however, cannot be taken at full face value. Comparisons of current sales figures with those of a year ago tend to be misleading, because of the fact that last year's totals were inflated by the wave of "scare" buying which followed the entrance of Red China into the Korean war. The downturn in wholesale prices has not been marked, and changes from one week to the next often prove erratic. Indications that the United States will increase its purchases of certain raw materials abroad suggest that basic commodity prices may firm up again in the near future. While total inventories continue at high levels, it is believed that a better balance has been achieved between stocks of durable and nondurable goods and among manufacturers', wholesalers', and retailers' inventories.

Inflationary Budgeting Proposals

In January, as is customary, the President outlined the Federal economic program for the coming year in a series of annual messages to Congress. The President's recommendations have been widely interpreted as marking the end of any prospect of carrying out the "pay-as-we-go" plan for financing rearmament. This view accounts largely for the inflationary implications that are being read into Mr. Truman's budget.

Planned expenditures for fiscal 1953 call for an outlay of $85.4 billion, or some $14.4 billion more than it is estimated present tax rates will yield. There seems to be little Congressional disposition to increase the tax load, which is already at a record peak. Consequently, unless sharp reductions are ordered in spending, it looks as if the Treasury will have to engage in extensive new borrowing operations. On the assumptions that expenditures are carried out as the President wishes and that the revenue estimate is accurate, the public debt would probably rise almost to the statutory limit of $275 billion by June 30, 1953.

In his budget message to Congress, Mr. Truman reminded the lawmakers that after the outbreak of the Korean war he had advocated an adherence to the "pay-as-we-go" principle. Trying to absolve himself from all responsibility for its abandonment, he observed that last year's legislation had provided little more than half the sum in new taxes which he had requested. He suggested that the legislators should raise taxes to the level he had previously recommended. Even if this were done, however, the estimated increase in revenue would close only about one-third of the prospective gap between expenditures and receipts, leaving an indicated deficit of about $10 billion.

Government Spending Too High

Many Congressmen obviously disagreed with Mr. Truman as to the reason for the unbalance of the budget. In a chorus of protest following transmittal of the budget recommendations, a number of Congressmen said, in effect, that the difficulty is not that taxes are too low but rather that spending is too high. Members of both parties pointed out that the budget

(*Turn to page* 100, *please*)

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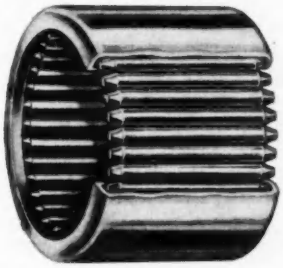
A full complement of small diameter rollers permits the distribution of loads over a large area. Needle Bearings have a smaller O.D. in relation to capacity than any other type of anti-friction bearing. Both civilian and military products can benefit from this and other Torrington Needle Bearing features. Ask our engineers to give you a helping hand.



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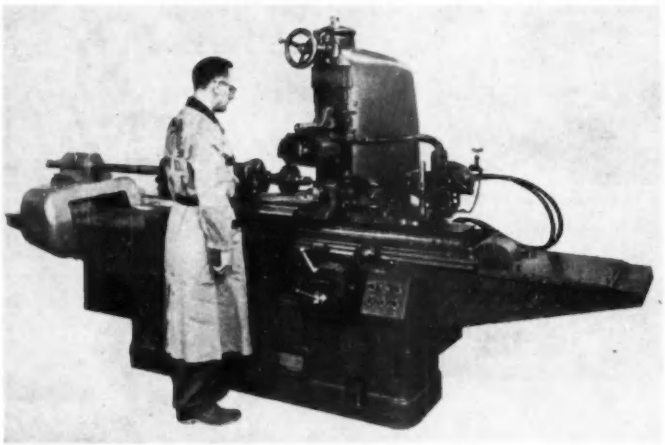
J-17—Helical Gear Grinder

The Red Ring helical gear grinder model SGF, designed primarily for the high precision form grinding of helical gears, may now also be used for spur gears and splines, according to the manufacturer, National Broach & Machine Co., Detroit, Mich.

Red Ring engineers have adopted the lead bar principle with certain refinements for the helical grinder. Essentially it consists of an accurately ground master lead bar, operating through a pressure lubricated self-tightening anti-backlash saddle nut, with the work drive headstock coupled through the index plate to one end of the bar. As the lead bar is reciprocated, the work rotates with it. Thus, the lead of the work being ground is accurate and identical with that of the direct coupled master lead bar.

The split saddle nut through which the lead bar reciprocates is rigidly supported by a bridge housing bolted to the machine base.



The Red Ring helical gear grinder model SGF put out by National Broach & Machine Co.

J-18—Double-Action Toggle Presses

A series of four-point, double-action, toggle-drawing presses featuring quick advance and return speeds and extreme accessibility for maintenance purposes, has been developed by E. W. Bliss Co., Canton, Ohio. The presses are specially designed to meet the needs of the automotive and allied industries by making possible higher production rates for large-area, drawn stampings.

Greater production rates, according to the firm, have been made possible

(*Turn to page* 58, *please*)

News of the Machinery Industries

Subcontracting Up

Subcontracting now accounts for more than 20 per cent of the nation's machine tool production, representing a higher proportion of output than was reached at any time during World War II, according to Tell Berna, General Manager of the National Machine Tool Builders' Association. Speaking before the Engineers' Society of Western Pennsylvania, Mr. Berna stated that subcontracting has always been the method chiefly relied upon by machine tool builders to increase production rapidly in time of suddenly rising demand. But in such periods snags often develop which are nobody's fault and are apparently inevitable because situations change as the program develops.

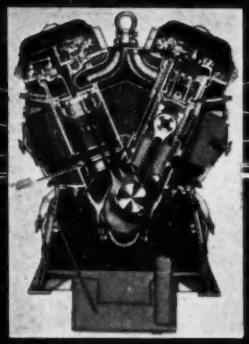
Bullard-Fisher Deal

He said, "An example is the instance of the Bullard subcontract to Fisher Body, which has been subject to considerable discussion. The actual facts are these:

"It was estimated by the Air Force authorities that 757 42-in. vertical turret lathes as made by the Bullard Co., Bridgeport, Conn., would be needed for the jet engine program. This amount was obviously far beyond Bullard's capacity.

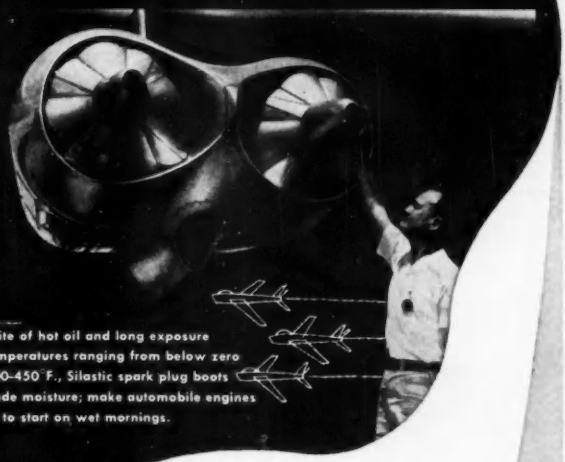
"The Fisher Body Div. of General Motors was therefore asked if it would take on a subcontract to manufacture these machines. It agreed to do so, although this would require the purchase on its part of a large amount of new equipment, since its existing equipment was not adequate for the making of machine tools.

(*Turn to page* 92, *please*)



Heating elements embedded in Silastic are used to prevent icing of air intake doors on jet engines.

In diesel-electric locomotives, Silastic gaskets for cylinder liners, water ports and oil pans, eliminate major overhauls previously caused by premature failure of organic rubber seals.



In spite of hot oil and long exposure to temperatures ranging from below zero to 400-450° F., Silastic spark plug boots exclude moisture; make automobile engines easy to start on wet mornings.

Silastic* works where ordinary rubber fails

At temperatures from −100° to over 500° F., in contact with hot oil at 350-400° F., in spite of weather, corona, shock and vibration, you can count on Silastic to maintain a tight seal or to confine electricity at high or low voltages. That's proved by the fact that Silastic is used to insulate traction motors, Navy control cable and ignition cable for aircraft and ordnance vehicles. It's used to seal heating and deicing systems, bomb bay doors, limit control switches and rocker box covers on aircraft; sole plates in domestic steam irons; cylinder liners and water ports in diesel-electric locomotive engines.

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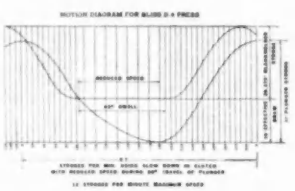
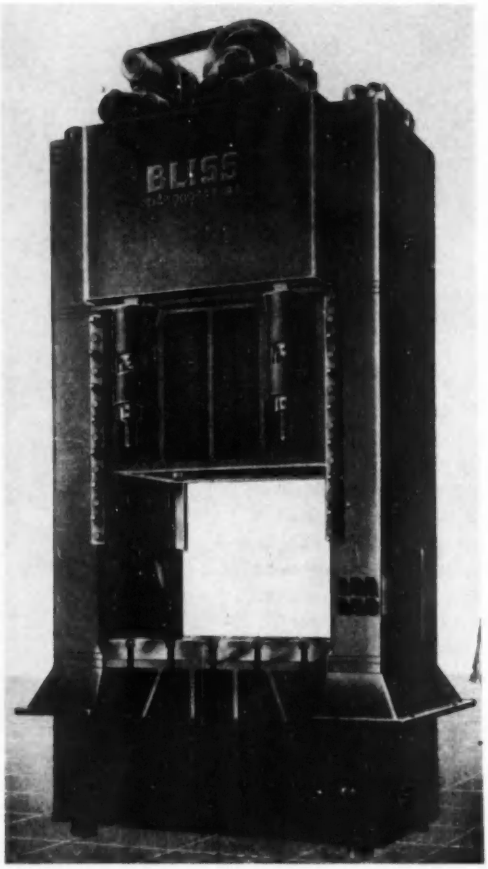
(*Continued from page* 56)

through use of the eddy current clutch which provides for quick approach to the work, slow-down to give proper drawing speeds, and quick return speed to the top of stroke. Even with comparatively slow drawing speeds, a rapid press cycle is possible. The slow-down is accomplished by controlled slippage of the eddy current drive clutch through limit switches which can be adjusted to vary the speed of any portion of the draw cycle.

There are three cross-members in the crown which contains four totally enclosed gears with integral eccentrics



for operating the plunger slide. Crown sections beneath the gears form a rigid tie member for the front, center and back transvertical sections.



Bliss four-point, double - action, toggle-drawing press features quick advance and return speeds.

J-19—Monochromatic Light

DoALL Co., DesPlaines, Ill., has brought out a monochromatic light with 10 times the capacity of the previous model. Called Monolight, it is a self-contained unit having a 5 in. by 5½ in. high-intensity helium tube light source providing 53-ft cp on the testing stage. The standard stage is a 6⅛ in. by 4⅛ in. phenolic plate which can, at additional cost, be substituted by a granite surface plate lapped to within one wave band of true flatness. Under the hinged work stage there is sufficient storage space for six two-in. optical flats or three each of three-in. or four-in. flats. Storage space is also provided to house the five-ft extension cord.

Specifications

Weight	30 lb
Height, closed	9½"
Width	8"
Length	11¼"
Max. height, stage to light	9"
Max. height, table to light	16"

Do-ALL monochromatic light, Monolight.

Power is supplied by a 7500-v transformer operating on 110-120 v 60 cycle a-c. The helium tube light source provides interference bands at 0.0000116-in. intervals, and can be used to measure size, flatness and parallelism to within a few millionths of an inch.

To inspect large areas or greater work heights, the head, or light source, may be turned 180 deg.

J-20—Dust Collector

Pangborn Corp., Hagerstown, Md., is offering a cloth-bag collector for dusts such as carbon black, cork, graphite, pigments, lamp black, soap, metal oxides and other dusts with similar characteristics. Simplified design of filter bags and mechanism for reclaiming dust from the bags, is said to provide dust control at low equipment and installation cost.

In order to satisfy dust collection requirements, Pangborn cloth-bag dust collectors range from five to 40 ft long, contain 1360 to 10,880 sq ft of filter

(*Turn to page* 64, *please*)

Announcing

Sealed Power KromeX

FULL-FLOW RING SETS

Chrome-Faced, Chrome-Alloy Top Compression Ring

Note Mechanical Interruptions

This cross-section micro-photograph shows solid chromeface, factory-lapped to a light-tight finish for quick seating, and mechanically interrupted for extra oil-carrying capacity. Sides of ring are Granosealed for quicker seating and greater flexibility.

All rings in KromeX RING SETS are beveled, tapered, or finished to thread-line contact for quick seating and blow-by control.

MD-50 STEEL OIL RING

Now Better Than Ever!

NEW: Chrome-faced rails for double mileage!

NEW: Granosealed rail sides for greater flexibility!

The only ring with the ***FULL-FLOW SPRING!***

Repeatedly proved best for OIL CONTROL

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- **CAN'T BLOCK ANY RING SLOTS!**
- **TWICE THE USUAL BEARING AREA for easier starting and longer life!**

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Sole manufacturers of KromeX Ring Sets, MD-50 Steel Oil Ring, Full-Flow Spring, and GI-60 Groove inserts.
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AIRBRIEFS

By ROBERT McLARREN

Administration Double Talk

The Air Force has found itself squarely between the American people (whom it has sworn to protect) and the Democratic National Committee in its recent "rescheduling" of the aircraft production program and has, like all good Administration soldiers, sided with the campaign headquarters. The result is unadulterated subterfuge. It has carefully contrived an explanation of its recent reshuffling of the production program which says that the action *will not affect the total number of airplanes to be built* but will only spread out the time over which they will be built. This, we submit, is double talk at its worst—or best. The only yardstick that has ever been used to measure aircraft production, at least in this writer's memory, has been the *annual production volume.* If this figure is reduced the result is a cutback, and all the philologic contortions in the English language won't change it. What the Air Force is really trying to say is that they are now asking only for what they are getting. Since the new schedule is based on present performance, that is literally not a cutback in what the industry is producing, but it is a whale of a cutback in what the dreamy-eyed ODM planners had mapped out. Actually the Air Force was put on the spot by the situation and they may, in fact, have been a joint victim with the industry of the grandiose pronouncements of the Administration, notably the classic White House announcement that production would triple within a year. However, since the American people cannot be told that their back-breaking defense mobilization program for aircraft is being cut back in an election year, the smooth-sounding "revision of schedule," "reprogramming," etc. is the order of the day in Washington.

No Heads or Tails

Time was when the Federal Budget comprised a list of what was going to be spent in a fiscal year—but not so any more. These days the budget contains money to spend, money to obligate and money to liquidate previous contract obligations. Thus, the fiscal 1953 budget is a discussion of the last two years, next year and the following two years, so that any profound index to aircraft procurement is missing from the 1953 budget. It expresses the double talk discussed above, insofar as it reduces the amount of money to be appropriated for aircraft production over the previous year but, at the same time, calls for the spending of more money during the year in payment for goods delivered. For example, last year the Air Force was free to let contracts in the amount of $11,257,396,000 but could only spend about $4 billion in cash. The 1953 fiscal year budget cuts back the contracting authority to $10,696,234,000 but will permit the Air Force to spend $10,685,044,000 in cash during the year, of which $1,685,044,000 is due on last year's contracts. This means that aircraft industry "sales" for the year should drop, but their actual income in hard cash should increase substantially.

Naval Aviation has about the same situation. Last year it had $3,883,000,000 to obligate and only $1.2 billion to spend in cash. In fiscal 1953 it will have $3.5 billion to obligate, but $2.5 billion to spend. Army aviation (light planes and helicopters) is cut about in half on both counts. All of these data refer to the procurement of aircraft, parts and equipment. The myriad other facets of military aviation procurement will remain very broadly the same as the current fiscal year with research and development programs holding nearly constant. Guided missile procurement will be doubled under the new fiscal year request for the Air Force and quintupled by the Navy, indicating the promise of increasing productivity in this long frustrating field. This missile procurement, however, is chiefly training missile and target drones; no intercontinental atom missiles yet—or even in the foreseeable future.

Past the Century Mark

For many years when engineers wanted to discuss a hypothetical fighter plane they invariably called it the "P-100." They will now have to move their conversational airplane up to 200 for the Air Force reveals that there is now such an airplane, the North American XF-100 Super Sabre. The new design, scheduled for procurement with the new fiscal 1953 money, is a slightly larger, heavier, more powerful Sabre mounting the big new General Electric J73 turbojet engine. But the numbers now run on into the McDonnell XF-101 (an improved version of the long-overlooked XF-88 Voodoo jet fighter) and the Convair XF-102, a combat version of the delta-wing XF-92A research airplane. Those who would criticize aircraft industry progress can examine the fact that the creation of 102 separate fighter design projects in 26 years averages out to about four new fighters a year and when the various separate models of each are added (the total is actually 330), the total is about one dozen new

(*Turn to page* 68, *please*)

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HALF-WAY TO THE MOON
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Publications AVAILABLE

New Industrial Literature listed in this department is obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.

H-38 Thermoplastic Extrusions

Anchor Plastics Co., Inc.—The 1952 edition of an eight-page illustrated brochure "Extruded Plastics" has just been published. The brochure describes the latest applications of custom-made thermoplastic extrusions. It has sections describing the facilities and range of extrusions available, applications of extrusions to particular products, and a digest of properties of thermoplastics with a table.

H-39 Ball Bearings

New Departure Div., General Motors Corp.—Use of ball bearings for farm disk implements is described and illustrated in an 18-page booklet.

H-40 New Cutting Aid

Gulf Oil Corp.—Hi-Jet, a twin development that is said to greatly increase tool life and production, is described in a recently published brochure. The method of delivering cutting oil under pressure from below the cutting tool is fully illustrated.

H-41 Chemical Cutting Solution

F. E. Anderson Oil Co.—A booklet is now available which describes Lusol—an all chemical metal working solution. Various case histories are presented.

H-42 Dehydrator for Liquid Fuels

Bowser, Inc.—A bulletin covers complete data on a new dehydrator for Diesel fuel gasoline, kerosene and fuel oils. In capacities up to 600 gpm, construction and dehydrating elements are fully described as well as the unique method for removing unexpected large slugs of water.

H-43 Permanent Magnets

Carboloy Dept., General Electric Co.—A complete listing of stocked sizes and shapes of Carboloy Alnico permanent magnets is included in Bulletin PM-100 now available.

H-44 Presses

E. W. Bliss Co.—Publication of a 36-page catalog, No. 30-A, describing and illustrating complete line of Hydro-Dynamic presses has been announced. It includes sections devoted to single-action housing and open-rod presses, double-action housing and open-rod presses, special function presses, material handling devices and hydraulic cushions.

H-45 Lubricant

Parker Rust Proof Co.—The January issue of The Parkerizer contains an article on the use of Parco-Lubrite in the manufacture of the Cummins Diesel engine.

(*Turn to page* 102, *please*)

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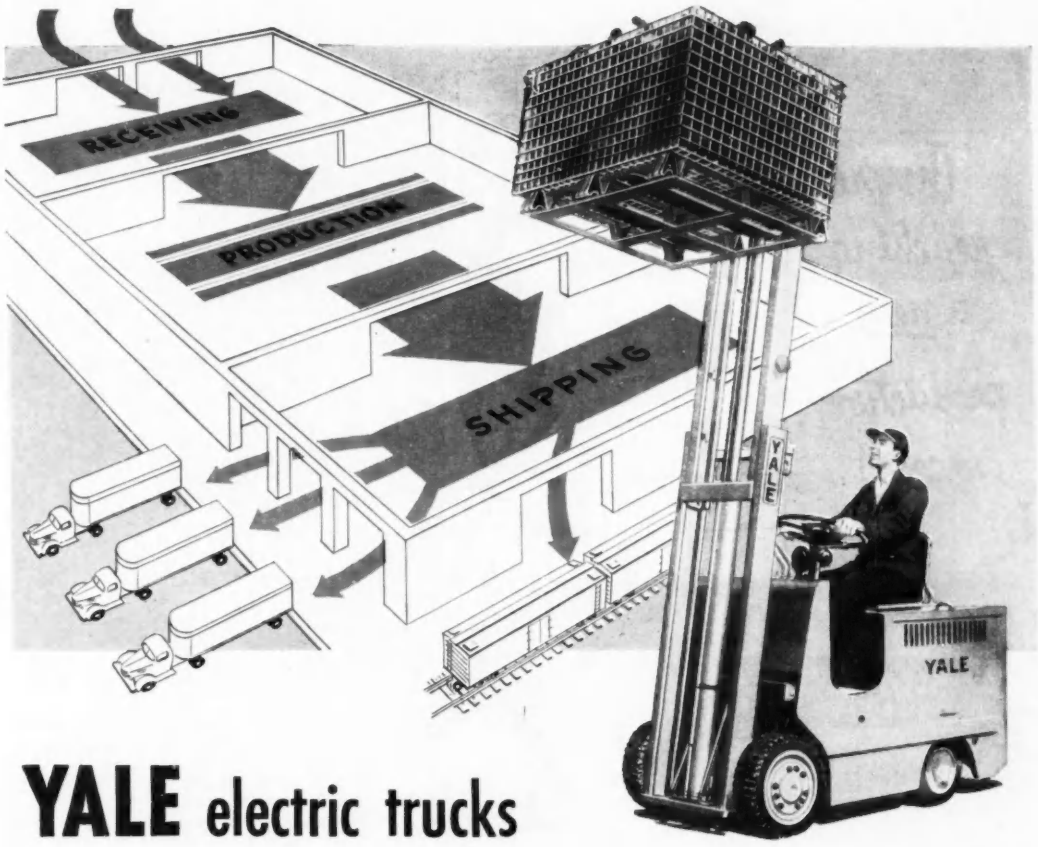

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The Yale & Towne Manufacturing Co., Philadelphia 15, Pa.

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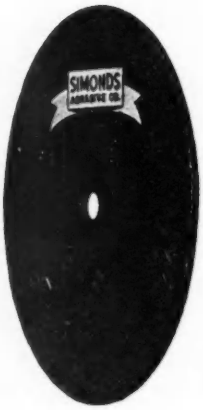

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NEW PRODUCTS

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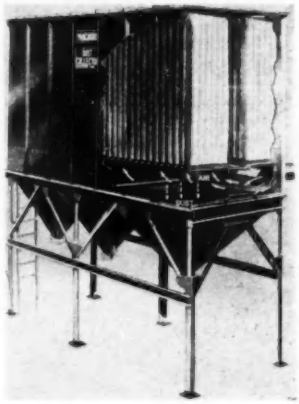
(*Continued from page* 58)



Pangborn cloth-bag dust collector.

cloth, employ from one to six hoppers, and are supplied with the appropriate structural supports to furnish the type of disposal desired—wheel-barrow, car, truck, etc.

Bags are fastened, open end down, by wing-nuts to suspension members. Each bag contains a rubber hem at the open nozzle end. The nozzles, by clamping a hand knob, are sealed over grid openings in the floor of the collector.

When the equipment is in operation, dust-laden air piped from the plant enters the collector at a point just under the grid floor. The air loses velocity and the heavier particles fall into hoppers. The air then rises through the grid into filter bags sealed over each grid opening. All air passes through the bags on its way to the air outlet at the top of the collector.

Dust captured in the bags is removed by shutting down the exhauster and turning on the shaker motor. The shaking and bag suspension members are combined to prevent duplication of parts and to simplify collector design. Dust shaken from the bags falls through the grid openings into hoppers. Opening a valve at the bottom of the hopper discharges dust from the collector for reclamation or disposal.

J-21—Cutting Oil

A twin development, which is said to increase metal cutting tool life from 300 to 1200 per cent, has been an-

(*Turn to page* 66, *please*)

When Auto Radios Present a Tough Problem

"Here's the hitch! We've got to come up with a radio that will fit in this small space. It'll be an odd shape, too."

"Let's talk to Bendix. They've solved more and tougher problems than anybody in the radio business."

TALK TO **Bendix**

MOST TRUSTED NAME IN **Radio**

When your radio requirements call for unusual shapes or sizes, do what others have done. **Call in Bendix* Radio.** Bendix engineers have solved so many radio and electronic problems that it's virtually impossible to startle them with any request—no matter how impossible it may seem.

And, of course, you can always be certain of getting quality products when you deal with Bendix. Their auto radios have been performance-proven on the cars of one of America's largest manufacturers.

If your problem is price or production, Bendix can be of *real* assistance. They have long been recognized as leading automotive suppliers who understand production line costs and methods.

It boils down to this: if your problem is design . . . or quality . . . or price and production . . . or even if you have no particular problem, it will pay you to talk to Bendix. *REG. U.S. PAT. OFF.

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BENDIX RADIO DIVISION of Bendix AVIATION CORPORATION

BALTIMORE 4, MARYLAND

NEW EQUIPMENT PLANT · PRODUCTION

For additional information regarding any of these items, please use coupon on page 62

(*Continued from page 64*)

nounced by Gulf Oil Corp., Pittsburgh, Pa. The developments are Hi-Jet and Gulf Hi-Jet oil, both products of the laboratories of the Gulf Research & Development Co., a subsidiary of Gulf Oil Corp.

Hi-Jet represents a departure from the conventional method of metal cutting lubrication. Small high-speed jets of oil are directed—not from above—but from below the cutting tool. The streams of oil are aimed at the line of contact between the work and the cutting edge. And because the lubricant is reaching the point of cutting contact where the friction or heat is actually generated, heat transfer away from the cutting edge is said to be greatly improved.

The entire unit consists of a jet, or a series of jets, flexible tubing, and a small pump capable of providing 400 psi. Hi-Jet will be manufactured by Thompson Products, Inc., of Cleveland, Ohio, under licenses from Gulf Research & Development Co. Current tooling schedules indicate delivery of the first production units on or about July 1, 1952.

For use in the Hi-Jet system, a special oil, known as Gulf Hi-Jet oil, has been developed.

Mile for Mile

Donaldson HEAVY-DUTY Mufflers cost you less!

DONALDSON COMPANY
Receiving-Inspection Tag
MODEL: M90016 Muffler
REMARKS: Removed for inspection at 103,000 miles
CONDITION: Cut-away reveals internal and external parts in good condition.

Over 103,000 miles and still in good shape! That's what engineers found when they removed this Donaldson Muffler from a 300 HP Diesel truck engine, picked at random on a West Coast Highway. Examined in the Donaldson laboratory, the muffler was found to be sound and free from structural weaknesses.

Fully-engineered, made of corrosion-resistant aluminized steel . . . Donaldson Heavy-Duty Mufflers combine long life with exceptional noise reduction and extremely low back pressure.

Fleet operators should contact local truck dealers. Manufacturers are invited to write direct.

Model M01201 Oval-Type for Under-chassis Installations. Dimensions: 10" x 15" oval, 25" body length, 4½" I.D. sleeves.

Dimensions Model M90016 vertical cab-mount muffler: Diameter 9", body length 45", I.D. sleeves 4½".

DONALDSON COMPANY, INC.
666 Pelham Blvd., St. Paul 4, Minn.

Donaldson Mufflers

J-22—Hydraulic Press

This C-frame hydraulic press, recently installed in a large ordnance plant, was designed and built by the Elmes Engineering Div., American Steel Foundries, Cincinnati, Ohio. The press has 75-tons capacity and is specially equipped for double-duty performance. A long table is provided for use of the press in straightening gun barrels. This table is removable, making the press usable as a general-purpose straightening press, and in addition an opening in the bed provides for forcing operations. The dual hand lever is interlocked with the foot treadle, and the ram will not descend until both of the hand levers and the foot treadle are depressed.

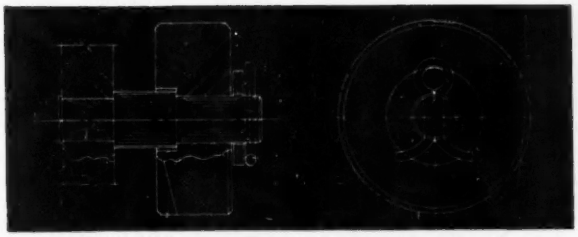
J-23—Industrial Crane

An electric powered, mobile crane, known as Model CZ, has been placed on the market by the Elwell-Parker Electric Co., Cleveland, Ohio. It has recently been redesigned with a wider bed and higher operator control pedals for better forward visibility.

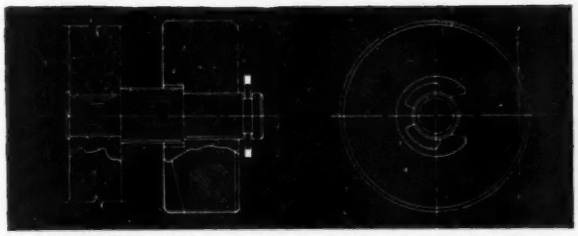
Among its outstanding design features are four wheel steering; telescoping boom to provide boom lengths of from 12 to 19 ft; silent worm drive;

(*Turn to page 70, please*)

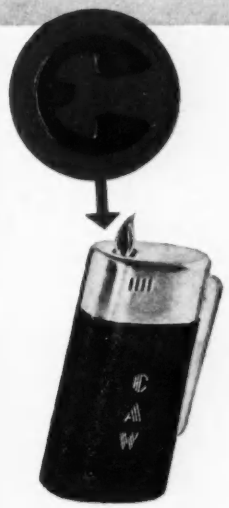
WALDES TRUARC RINGS REPLACE COTTER PINS... SAVE 44% IN LABOR AND ASSEMBLY COSTS



COTTER PIN WAY: Flint wheel shaft in lighter assembly requires cotter pin, washer. Difficulty in drilling perfect hole causes rejects. Assembly is slow, costly.



TRUARC WAY: Waldes Truarc "E" ring fits into groove in shaft; locks assembly securely for life. Groove is quickly, easily cut... assembly is simple, speedy.



Brown & Bigelow, St. Paul, Minn., saved *$6.95 per thousand units* by incorporating Truarc Rings in the design for the REDI-FLAME compressed gas desk lighter! In spite of greater initial cost of Truarc Rings as against cotter pins, they were able to cut machining and assembly costs drastically—for an overall savings of 44%!

Redesign with Waldes Truarc Rings and you too will cut costs. Wherever you have a fastening problem... wherever you use machined shoulders, bolts, snap rings, cotter pins, there's a Truarc Ring designed to do a better job of holding parts together.

Waldes Truarc Rings are precision-engineered... quick and easy to assemble and disassemble. They can be used over and over again.

Find out what Truarc Rings can do for you. Send your blueprints to Waldes Truarc engineers for individual attention, without obligation.

COMPARATIVE COSTS

Cotter Pin Way		Truarc Way	
Material	***$ Per M***	***Material***	***$ Per M***
Shaft	.48	Shaft	.35
Cotter pin	.46	Truarc ring	8.68
Washer	1.50		
	2.44		9.03
Labor		***Labor***	
Shaft	10.22	Shaft	2.27
Washer	.72		
Assembly	9.28	Assembly	4.41
	20.22		6.68
TOTAL	$22.66	TOTAL	$15.71

TOTAL SAVINGS WITH TRUARC RINGS: $6.95 or 44%

For precision internal grooving and undercutting... Waldes Grooving Tool.

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TRUARC

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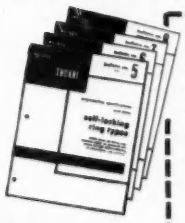

Waldes Kohinoor, Inc., 47-16 Austel Place, L. I. C. 1, N. Y.
Please send engineering specifications and data on Waldes Truarc Retaining Ring types checked below. AY 224

- ☐ Bulletin #5 Self-locking ring types
- ☐ Bulletin #6 Ring types for taking up end-play
- ☐ Bulletin #7 Ring types for radial assembly
- ☐ Bulletin #8 Basic type rings
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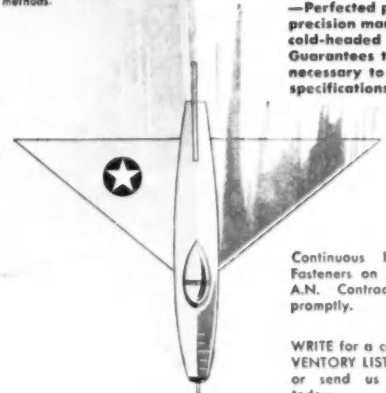

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"PRODUCTION-DESIGNED FOR YOUR ASSEMBLY LINE"

AIRBRIEFS

(*Continued from page 60*)

fighter models each year—all this while turning out bombers, transports and trainers in even greater numbers!

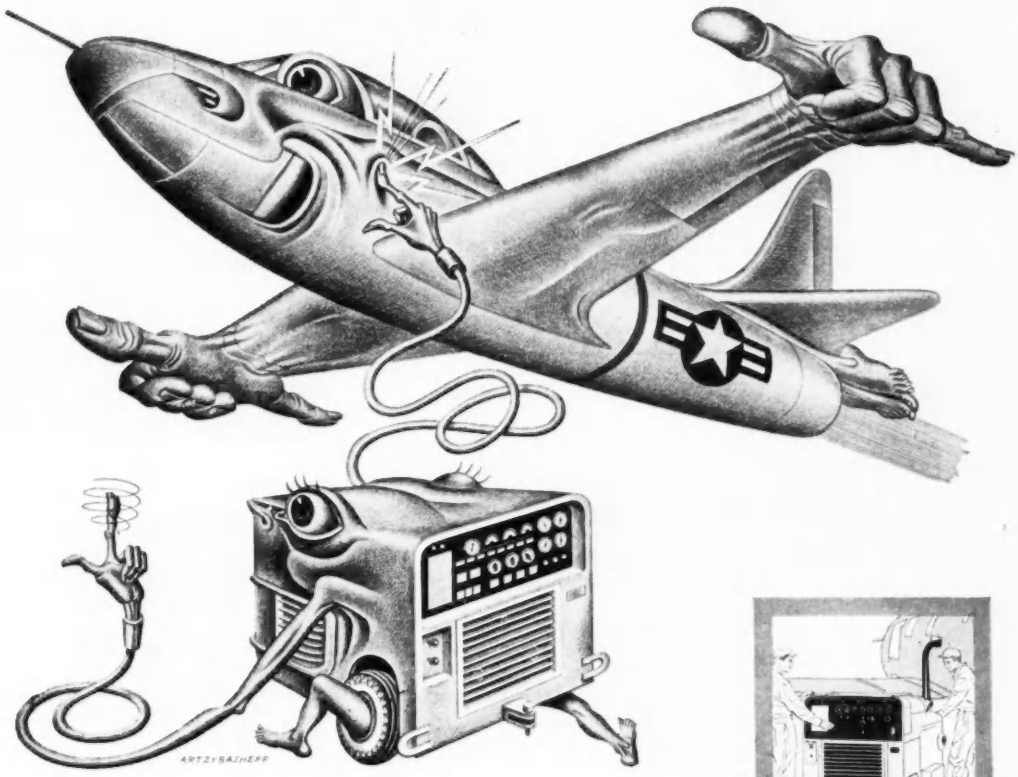
Crash Detectives

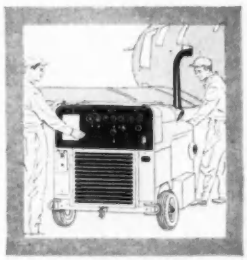
It is easy to belittle the effectiveness of aircraft accident investigators combing through several tons of scraps of burned and twisted metal seeking to determine the cause. There is none alive who will ever know—for sure—the cause of most tragic aircraft accidents but, like the pinning of murders on the guilty, very often the single tiny scrap is overturned as the culprit. A case in point was the recent strange experience of a Capital Airlines DC-4 transport passenger load which suddenly dropped some 2500 feet in a monstrous "downdraft." Several passengers were hospitalized and all were badly shaken, although the plane landed safely. Examination of the airplane revealed that a piece of doped fabric closing the trailing edge of the elevator had come loose and acted as a trim tab to shove the elevator down and pitch the airplane into a dive from which it recovered only through the full brute strength of the pilot and copilot on the wheel. Civil Aeronautics Administration immediately ordered all DC-4 operators to closely inspect this tape strip before their next flights and immediately began wondering about other DC-4's that have crashed without a survivor in the past few years. (This strip is applied by the airline mechanics—NOT the Douglas Aircraft Co.—Ed.)

Prognosticator

The value of predictions depends wholly on the stature of the predictor and when C. R. Smith, the president of American Airlines (largest in the U.S.), looks into the future it is well that we all pay attention. Smith says that all this talk about converting existing "super" airliners into turboprop-powered versions at a later day is wholly misleading and his airline, for one, isn't going to do it. The reason is quite simple: It would cost somewhere between $500,000 and $800,000 to put four turboprop engines in a Douglas DC-6 or a Lockheed Constellation and for this substantial expenditure the passenger would receive some 40 or 50 mph faster speed, which, in C. R.'s opinion, isn't worth the candle. He says the next step is right into pure jet transports designed expressly for the purpose and that these should come along in 1957 and be in service in 1958. It's going to cost "somebody" about $20 million to bring a new jet transport

(*Turn to page 99, please*)





Hot "juice" for cold jets

One generator for any climate, many uses! *Air-cooled*—to withstand −65° or +135°F. *Portable*—to wheel along rows of waiting jets. *Light* and *compact*—to tuck in a B-36 for dependable starting anywhere in the world. That's the power package developed by Lycoming and the United States Air Force.

If your need is power—or precision-machining, product development or high-volume production—Lycoming offers unusually extensive facilities and well-rounded experience. Long famous for aircraft engines, particularly to the military, Lycoming also meets the most exacting requirements of America's leading industries.

Whatever your problem, look to Lycoming!

AIR-COOLED ENGINES FOR AIRCRAFT AND INDUSTRIAL USES, PRECISION-AND-VOLUME-MACHINE PARTS, STEEL-PLATE FABRICATION, GRAY-IRON CASTINGS

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NEW PRODUCTS

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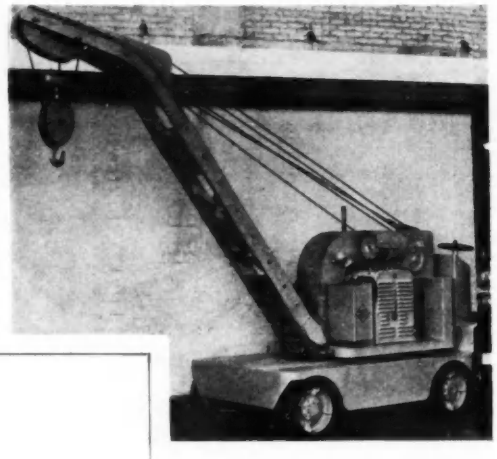
(*Continued from page 66*)

heavy welded steel frame; and three individual motors with solenoid operated brakes for powering slew, hoist and boom. Conventional wheel steer is standard but electric power steer is



Elwell-Parker electric industrial crane model CZ.

recommended when heavy loads are to be handled. Power is supplied by either an electric storage battery or gas-electric unit.

Crane capacity is 10,000 lb at 5½ ft radius. With the boom fully extended to 19 ft, a hook height of 18 ft can be obtained. Overall length and width are 130⅝ in. and 66¾ in. respectively. Solid tires 22 by 10 or 23¾ by eight cushion tires can be supplied depending on load demands. The truck turns in 95 in. intersecting aisles. Maximum slew is 296 deg.

When required, outriggers for increased over-the-side capacity can be installed and remote control of the boom, hook and slew from the load end can also be provided. The crane can be equipped with an electro-magnet for handling bulk ferrous materials.

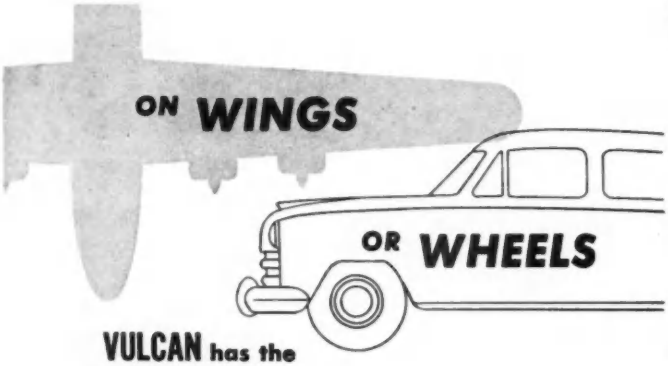
J-24—Overload Release

An overload release for the Dodge Torque-Arm speed reducer, which provides protection for driven machines, motors and the speed reducer itself, has been developed by the Dodge Manufac-

Dodge Tri-Matic overload release.

turing Corp., Mishawaka, Ind. Designed to prevent breakdowns, the product has been named the Dodge Tri-Matic overload release because of the triple protection which it affords. The release operates both mechanically and

(*Turn to page 72, please*)



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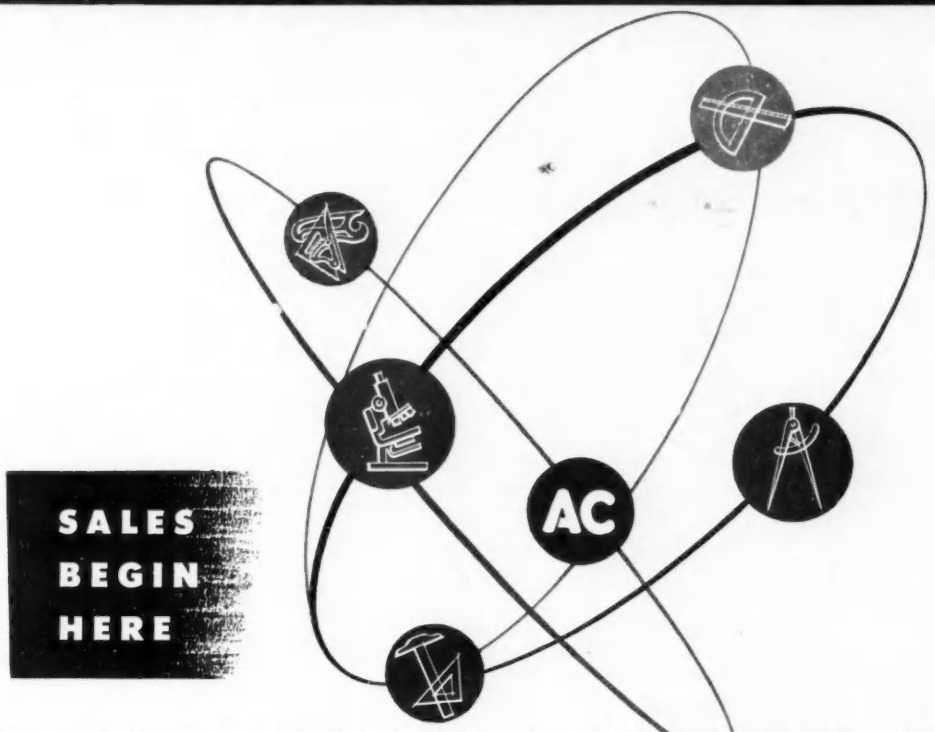

AC equipment units have solved many a designing problem for more than 300 automotive manufacturers, giving them tried and true quality features that are just what they need . . . and units that are expertly engineered and precisely manufactured.

AC makes 23 kinds of equipment products, one or more of which might be of real value in reducing your costs or adding sales advantages to your product. Why not investigate? Just address your inquiry to the nearest AC office listed below.

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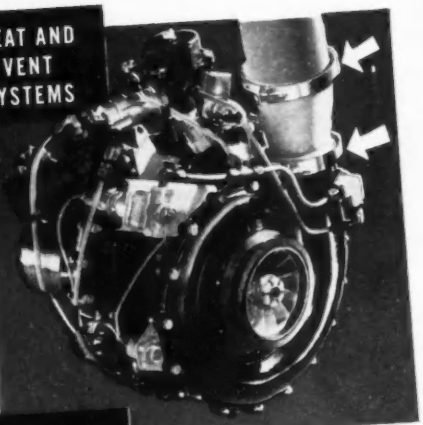
ENGINEERS NOTEBOOK

HEAT AND VENT SYSTEMS



V-Bands best for coupling cabin supercharger

The AiResearch cabin supercharger illustrated employs Marman V-Band Couplings to connect ducting between supercharger and engine. These couplings must withstand a maximum of 15 p.s.i.g. and 250°F. The unit is designed to use the same couplings at the inlet end under temperatures of −65°F. to +140°F. Max. In these and numberless other coupling applications the Marman V-Band provides great strength and a positive seal, light weight, and adaptability to a wide range of conditions, plus fast assembly and disassembly. Years of development have resulted in a standard line which fulfills virtually all requirements without special design...years of increasing use have created familiarity on the production line which results in great production savings.

Save Cost, Time and Weight with Marman

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NEW PRODUCTION AND PLANT EQUIPMENT

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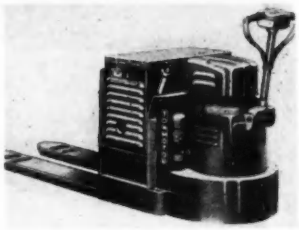
(*Continued from page 70*)

electrically to (1) loosen the belts (2) cut off the current (3) activate a warning bell, siren or light.

Pressure exerted by an excessive load load causes a piston to move lengthwise through the unit and this movement loosens the belts and cuts off the current simultaneously. The warning system is hooked up to the switch. The Tri-Matic is calibrated for adjustment to the load conditions of any job. It can be set to act at any desired load up to the reducer's maximum capacity. This unit replaces the standard torque-arm that is regularly furnished with the Dodge speed reducer—the two are interchangeable.

J-25—Pallet Trucks



A built-in generator, developed for use with Towmotor electric pallet trucks, provides constantly available power for round-the-clock operation, according to an announcement by Towmotor Corp., Cleveland, Ohio. The unit, called model W with Ready-Power, is an adaptation of Towmotor's standard electric pallet truck, with a small, gasoline-powered generator supplying constant, maximum voltage for operation of the truck. The Ready-Power mechanism is mounted in the standard battery compartment, with gasoline engine, fuel tank, starting battery and all accessories completely enclosed in the steel housing. Ample electric power is provided to move up to 4000 lb loads.

J-26—Hydraulic Cylinder

A 22-ft stroke hydraulic cylinder built from standard-type cylinder parts and that features a 24-ft long solid steel piston rod that does not sag under its own weight is said to open up many new applications for air and hydraulic cylinders by the manufacturer, Miller Motor Co., Melrose Park, Ill. This unusual cylinder is a four-in. bore, double acting, low pressure hydraulic cylinder.

(*Turn to page 76, please*)

NEW ARMY "OTTER" Newest, most versatile of Army amphibious vehicles. Scheduled for production by the Pontiac Division of General Motors, the "Otter," boasts the Army, can turn on a dime, swim, plow through mud and travel on dry land at speeds up to 36 miles an hour. Its efficient heating system relies on the South Wind "978"... for heating personnel and preheating the power plant.

NEW REO "EAGER BEAVER" Army's newest six-by-six . . . 2½ ton heavy duty utility vehicle and cargo carrier. Can travel up 60% grades or under water. A South Wind "978" defrosts windshield, keeps cab and personnel warm.

GENERAL PERSHING The Army's World War II medium tank — the M26. Personnel of this mighty, armored Goliath are kept comfortably warm, thanks to a South Wind "978" heater.

"MOBILITY RETAINED IN WINTER" WITH NEW MILITARY HEATER

South Wind "978" Preheats, Heats and Defrosts Army Vehicles Even at 70° Below

Keeping vital equipment functioning . . . skilled personnel warm under the severest weather conditions: It's one of many problems faced by the nation's new, more mobile, harder striking armed forces. A problem now successfully solved by an amazing new military heater—the South Wind "978."

Simplified in design. Compact. This rugged forced air heater preheats, heats, and defrosts in any type of military vehicle—in temperatures as low as 70° below zero. Dependably safe because the combustion air system is completely separated from the ventilating air stream. Always fast acting because warm air circulation doesn't depend on engine heat.

Built to Army Ordnance Specifications, the "978" has been standardized by the Army for its winterization program. And, because of its many exclusive advantages, promises to be influential in fashioning future designs for commercial car heating, too.

IMPORTANT: For complete details *plus* experienced engineering assistance, wire, write or phone Stewart-Warner Corporation, South Wind Division, Dept. E-22, 1514 Drover Street, Indianapolis 7, Indiana.

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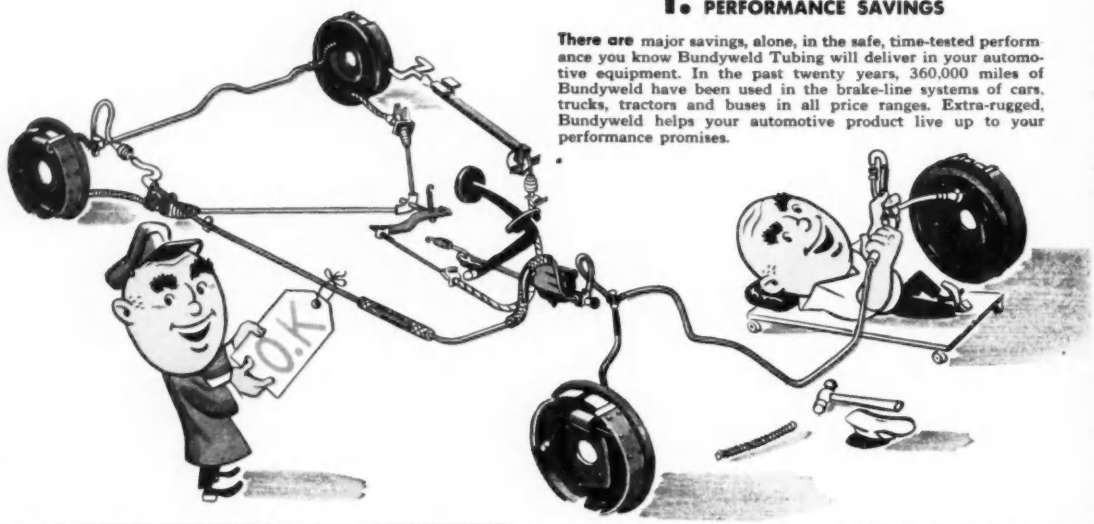
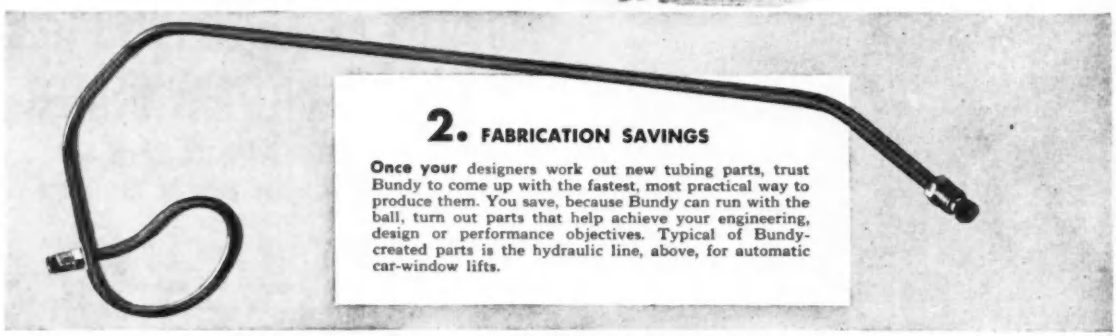
1. PERFORMANCE SAVINGS

There are major savings, alone, in the safe, time-tested performance you know Bundyweld Tubing will deliver in your automotive equipment. In the past twenty years, 360,000 miles of Bundyweld have been used in the brake-line systems of cars, trucks, tractors and buses in all price ranges. Extra-rugged, Bundyweld helps your automotive product live up to your performance promises.





2. FABRICATION SAVINGS

Once your designers work out new tubing parts, trust Bundy to come up with the fastest, most practical way to produce them. You save, because Bundy can run with the ball, turn out parts that help achieve your engineering, design or performance objectives. Typical of Bundy-created parts is the hydraulic line, above, for automatic car-window lifts.

Bundyweld® Tubing

DOUBLE-WALLED FROM A SINGLE STRIP

WHY BUNDYWELD IS BETTER TUBING

Bundyweld starts as a single strip of copper-coated steel. Then it's . . .

continuously rolled twice around laterally into a tube of uniform thickness, and

passed through a furnace. Copper coating fuses with steel. Presto . . .

Bundyweld, double-walled and brazed through 360° of wall contact.

← **NOTE** the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.

Bundy Tubing Distributors and Representatives: *Cambridge, 42, Mass.:* Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • ***Chicago 32, Ill.:*** Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey:*** A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.:*** Rutan & Co., 1717 Sansom St. • ***San Francisco 10, Calif.:*** Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.:*** Eagle Metals Co., 4755 First Ave. South ***Toronto 5, Ontario, Canada:*** Alloy Metal Sales, Ltd., 881 Bay St. • **Bundyweld nickel and Monel tubing is sold by distributors of nickel and nickel alloys in principal cities.**

automotive tubing buy

Specify Bundyweld Tubing and you buy time-proved, safe performance, priceless in itself. You buy tubing features without parallel, backed by engineering skills *dedicated* to cutting costs.

Measure all that you buy in Bundyweld Tubing against the performance standards and cost requirements you set for brake lines, oil lines, and other automotive tubing parts.

You buy safety. Since 1930, over a third of a million miles of Bundyweld Tubing have been used in brake lines of cars, trucks, buses, and tractors of all prices, kinds, and types. Billions of miles traveled by these vehicles prove Bundyweld's safety.

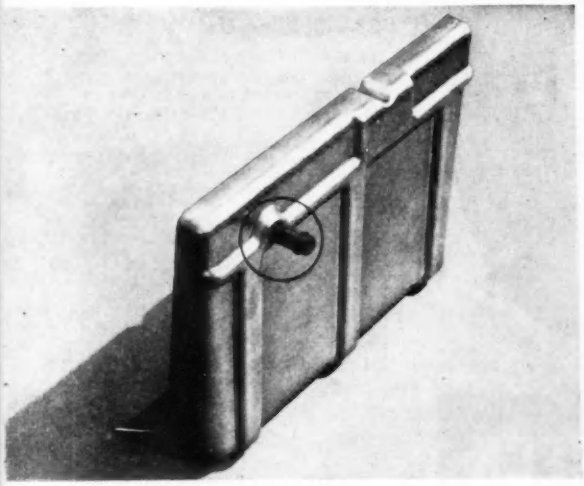
You buy tubing features without parallel. Bundyweld is the only tubing double-walled from a single strip, copper-brazed through 360° of wall contact. It's extra-sturdy, extra-strong; has high bursting strength, high resistance to severe shock and vibration fatigue.

You buy the industry's finest engineering skills, which can mean major savings in the long run. Bundy men called in during critical design and planning phase are often able to bring about major savings in materials, tooling costs, or production time at that point.

Then, promptly, and *as specified*, Bundyweld rolls into your production lines—either fabricated by Bundy or in lightweight coils and lengths for easy, economical fabrication by your men.

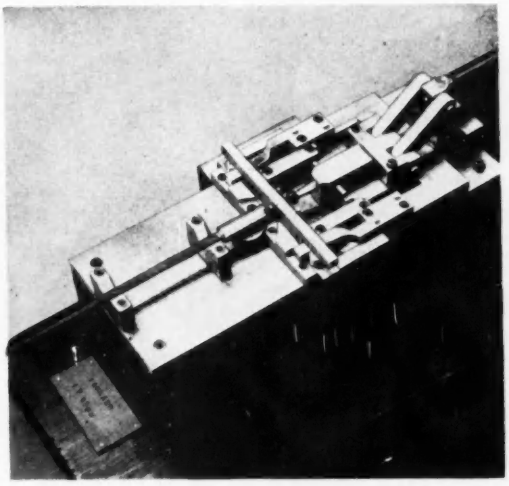
Price-minded, performance-minded automotive engineers know there is no adequate substitute for Bundyweld Tubing. *Or* for Bundy skills.

Contact a Bundyweld Distributor (listed lower left), or write direct to *Bundy Tubing Company, Detroit 14, Michigan*



3. COSTS CUT

You save through constant efforts inside Bundy to ferret out better, faster, more economical production methods. Example: Special burring operation on drain tube (circled) in battery tray, above, has now been eliminated by an improved production technique, and savings passed on to Bundy customer in lowered costs per unit. For *true* economy in automotive tubing parts, specify Bundyweld!



4. MORE PRODUCTION SAVINGS

Bundy-built assembler, above, demonstrates more typical Bundy production advances. Assembler automatically slips rubber washer over bead at end of tube, eliminates former expensive hand operation, speeds output at appreciably lower cost, which Bundy customer shares. Look into the ultimate cost of tubing; count by count, you'll find Bundyweld is your finest tubing "buy."

NEW EQUIPMENT PLANT · PRODUCTION

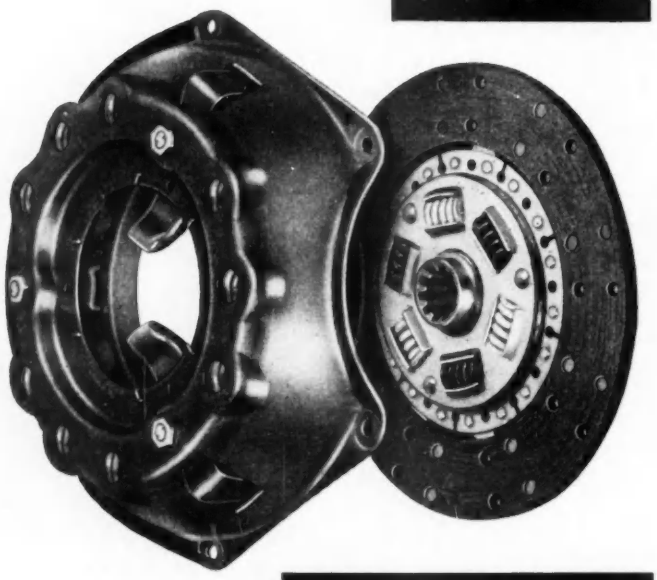
For additional information regarding any of these items, please use coupon on page 62

(*Continued from page 72*)

The 24-ft long piston rod is 2½-in. diam and is hard chrome plated.

The cylinder itself is of standard Miller construction with square, solid steel heads and caps, dirt wiper seal, leakproof rod seal that automatically compensates for wear, and other standard Miller features.

Engineered by Borg & Beck... means MAXIMUM PERFORMANCE MINIMUM MAINTENANCE!



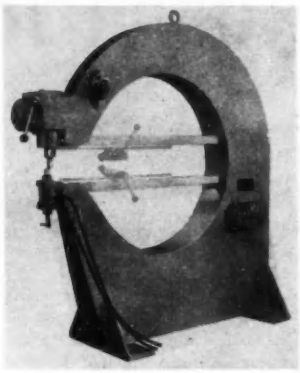
You can depend on BORG & BECK® CLUTCHES...FOR THAT VITAL SPOT WHERE POWER TAKES HOLD OF THE LOAD!

BORG & BECK CLUTCH THE STANDARD Reg. U.S. Pat. Off.

BW

BORG & BECK DIVISION • BORG-WARNER CORPORATION
Chicago 38, Illinois

J-27—Trimmer

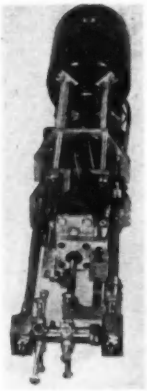


Recently introducted into the American Pullmax Co., Chicago, Ill., line of sheet steel and plate cutting equipment is the Pullmax Trimmer. For cutting excess metal from bulky stampings, the lower tool holder is raised and lowered by pneumatic pressure. It does all the work of straight, circle and irregular cutting that the standard Pullmax does. (Bars that hold circle and straight cutting attachments are removable.) The box construction frame, however, is circular in shape to provide clearance for large and bulky pieces.

The Pullmax Trimmer works mild steel up to 5/32-in. at a speed from four to 16 fpm. It has a throat depth clearance of 48 in. and is powered with a one hp motor. Mechanism is totally enclosed and operates in oil.

J-28—Drilling Unit

Black Drill Co., Inc., Cleveland, Ohio, has announced the development of a drilling unit suited to a wide range of work. It combines all the features of the

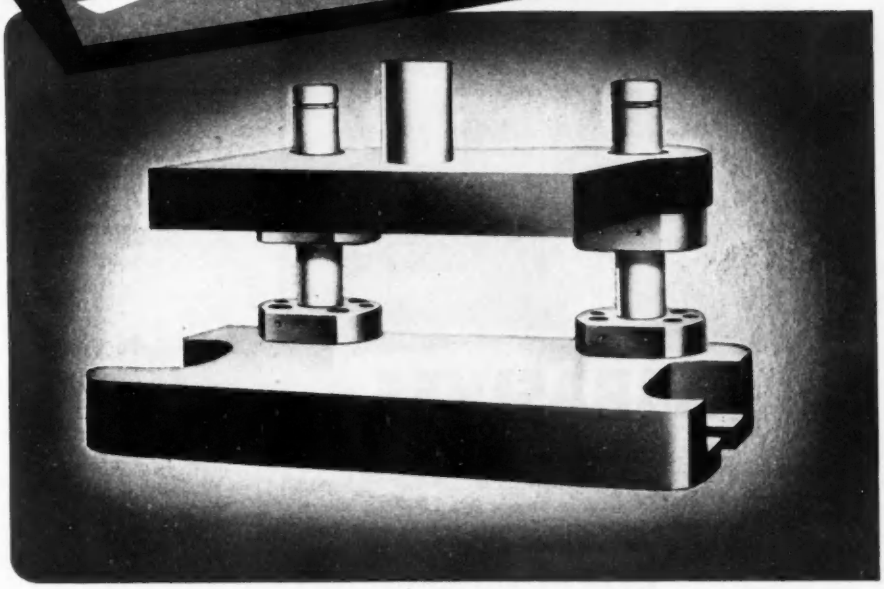


Black drilling unit.

standard traversing motor shaft type Black drilling unit with a four-in. working travel and a skip stroke attachment, making it suitable for deep drilling, drilling in hard to get at locations,

(*Turn to page 78, please*)

Baumbach Die Sets



ARE TODAY'S BEST BUY

Because all die sets produced in the Baumbach shops are first Blanchard ground and then surface ground to give you extra accuracy and high finish. We invite you to compare them with any other make.

During our 40 years in business we have made about three million die sets. Don't take less than Baumbach quality because there is no substitute for experience, even in die sets.

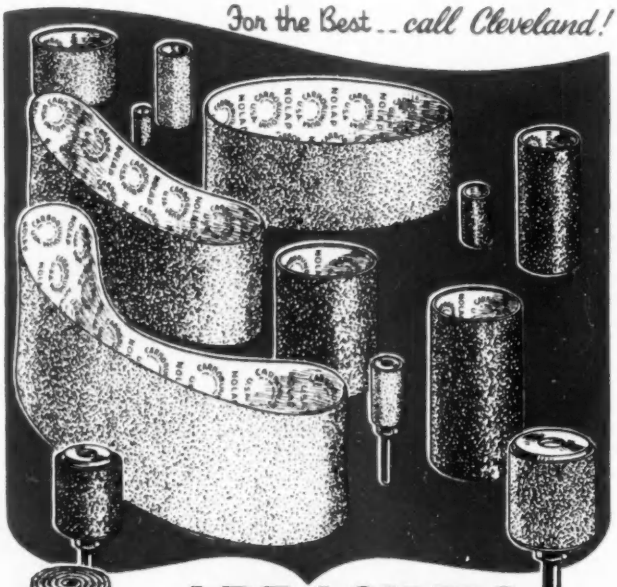
Only Baumbach gives you improvements like demountable leader pins and bushings. Both are hardened, ground and super-finished for greater accuracy. Think of the time and labor saved in machining, regrinding and counter-boring.

All Baumbach accessories have been tested in actual use over a long period of time. Millions of Baumbach die springs are in daily use. Other items like leader pins and bushings, stripper bolts, screws, rubber, leader pin oil and hundreds of other products are giving good service to the stamping industry.

E. A. BAUMBACH MFG. CO.

1818 SOUTH KILBOURN AVENUE CHICAGO 23, ILLINOIS TELEPHONE CRawford 7-4041

For the Best .. call Cleveland!



ABRASIVES

... of Carborundum Quality ...

NO-LAP Abrasive Sleeves and Expanding Drums, Belts, Smoke Hole Cleaners and Abrasive Cartridge Rolls and Mandrels

MEET EVERY NEED

... in sanding, polishing and cleaning up.

Send for our NEW FOLDER giving varieties, sizes and complete data. Advise grit, diameter or length and width you desire. SAMPLES and PRICES gladly furnished.

CLEVELAND ABRASIVES give long wear, and their constant cutting surface means improved performance!

Whether the job be great or small, Cleveland Abrasives save time, money and effort.

The CLEVELAND CONTAINER Co.

6201 BARBERTON AVE. CLEVELAND 2, OHIO

- All-Fibre Cans • Combination Metal and Paper Cans
- Spirally Wound Tubes and Cores for all Purposes

PLANTS AND SALES OFFICES: Cleveland, Detroit, Chicago, Plymouth, Wisc., Jamesburg, N. J., Ogdensburg, N. Y. • ABRASIVE DIVISION at Cleveland SALES OFFICES: Grand Central Terminal Bldg., New York City; Washington Gas Light Bldg., Washington, D. C.; West Hartford, Conn.; Rochester, N. Y. Cleveland Container Canada, Ltd., Prescott, Ontario • Offices in Toronto and Montreal

NEW PRODUCTION AND PLANT EQUIPMENT

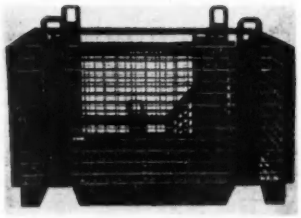
For additional information please use coupon on page 62

(*Continued from page 76*)

and accurate drilling in materials requiring frequent chip clearing.

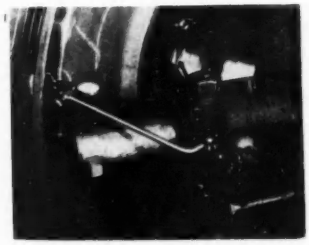
This unit is designed to operate in any position. Air feed provides rapid advance to the work. Hydraulic control provides uniform drill feed even when breaking through. Micrometer stop insures depth accuracy to 0.001 in. from one to six skip stroke stops are provided. It is made in ¼ to five hp sizes.

J-29—Tote Boxes



Kerlow Steel Flooring Co., Jersey City, N. J., has announced that Kerlow open steel-grating Tote Boxes can be made in any size, shape or form to meet specialized requirements and individual specifications.

J-30—Indicator Holder



Cullen Manufacturing Co., Racine, Wisc., is bringing out a Model 200 magnetic dial indicator holder with a precision adjusting device controlling the positioning of the dial holding rod. This indicator holder has a 45 to 50 lb pull magnetic base. Magnets are guaranteed lifetime Alnico. The holder rod is 6½-in. long non-magnetic, ¼-in. stainless steel. It is set in a ball socket permitting universal settings and immediate readings. Adaptor bushings are available for use with indicators having 5/16-in. or ⅜-in openings.

"Made for Each Other!"

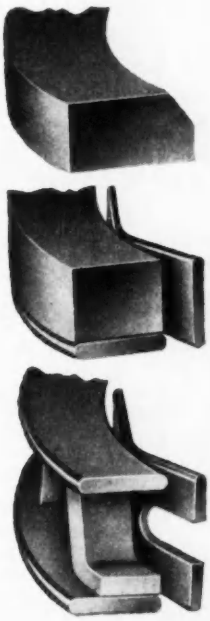
SERVICE PISTON RING SETS BY MUSKEGON

In a *new* car, all parts have been designed and made to work perfectly together in their particular engine. *Service* parts, too, should be produced in this very same manner to insure top performance.

And that is the way Muskegon produces piston rings—by close collaboration with the car manufacturer so that each set of rings and its corresponding engine are truly "made for each other."

To provide this superior type of piston ring, Muskegon has developed an unusually *complete* service—not only design and engineering, but the most modern facilities for casting, processing, finishing, inspection, and packaging.

These *Factory Approved* and *Factory Engineered* Service Piston Ring Sets are available only through car dealers and other authorized service outlets.



MUSKEGON
Piston Rings

MUSKEGON PISTON RING CO.
MUSKEGON, MICHIGAN
PLANTS AT MUSKEGON AND SPARTA

"THE ENGINE BUILDERS' SOURCE"

Copyright 1952 by Muskegon Piston Ring Company

NEW PRODUCTS

For additional information regarding any of these items, please use coupon on page 62

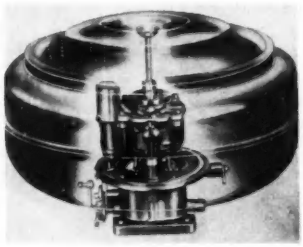
K-54—Carburetors

Holley Carburetor Co., Detroit, Mich., has brought out two important new carburetors: The Holley Visi-Flo for popular priced cars and light trucks, and the Centri-Flo for luxury passenger cars and heavy-duty trucks.

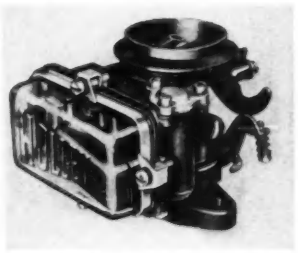
Only four-in. in height, the Visi-Flo meets the modern styling requirement of lower hood lines. This 32 per cent savings in height combined with the glass fuel bowl reduces the amount of scarce metals ordinarily needed. The model 1904 is a 1¼-in. SAE Standard single downdraft for 80-120 hp engines. Model 1904 is also available with 1½-in. SAE Standard flange.

Visi-Flo is said to be the first modern carburetor to be designed, tested, and approved to have a fuel bowl made of clear glass. All the important metering parts are contained in one complete assembly.

The functional design of the Centri-Flo eliminates the conventional air intake casting. Centri-Flo concentric carburetor is 1¼-in. SAE Standard dual-downdraft for 110-180 hp engines. It is the Holley model 1901.



Holley Centri-Flo for large passenger cars and heavy duty trucks.



Holley Visi-Flo for popular priced cars and light trucks.

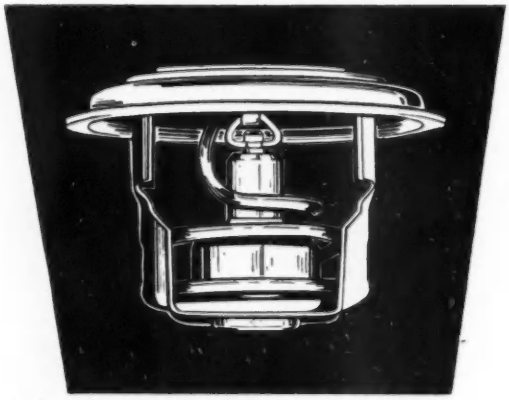
Holley Centri-Flo is claimed to be the first commercially accepted carburetor with a high capacity air cleaner mounted so that it fits over and around the carburetor almost hiding it. The air cleaner is integrally designed for this carburetor. An adapter mounting that rotates 360 deg is available for commercial installation which requires the air cleaner to be mounted away from the carburetor. Thus, a tube may be run at any angle from the carburetor to the air cleaner. The Centri-Flo is a true concentric carburetor with a fully insulated fuel bowl. All metering parts are located at the center line of the fuel bowl.

(*Turn to page 82, please*)

ORIGINAL EQUIPMENT ON MANY LEADING CARS AND TRUCKS

DOLE

Thermostats



Thermostat Suggestion:

To Automotive Engineers—

- Remember that Dole Thermostats are different in principle and performance.
- It was the advent of the new Dole Thermostat that made feasible the smaller radiators and the sealed cooling systems.
- Dole Thermostats are designed to give top performance on the new cars with high pump pressures.
- Plan and specify Dole Thermostats for both today's cars and those on your drawing boards.

THE DOLE VALVE COMPANY

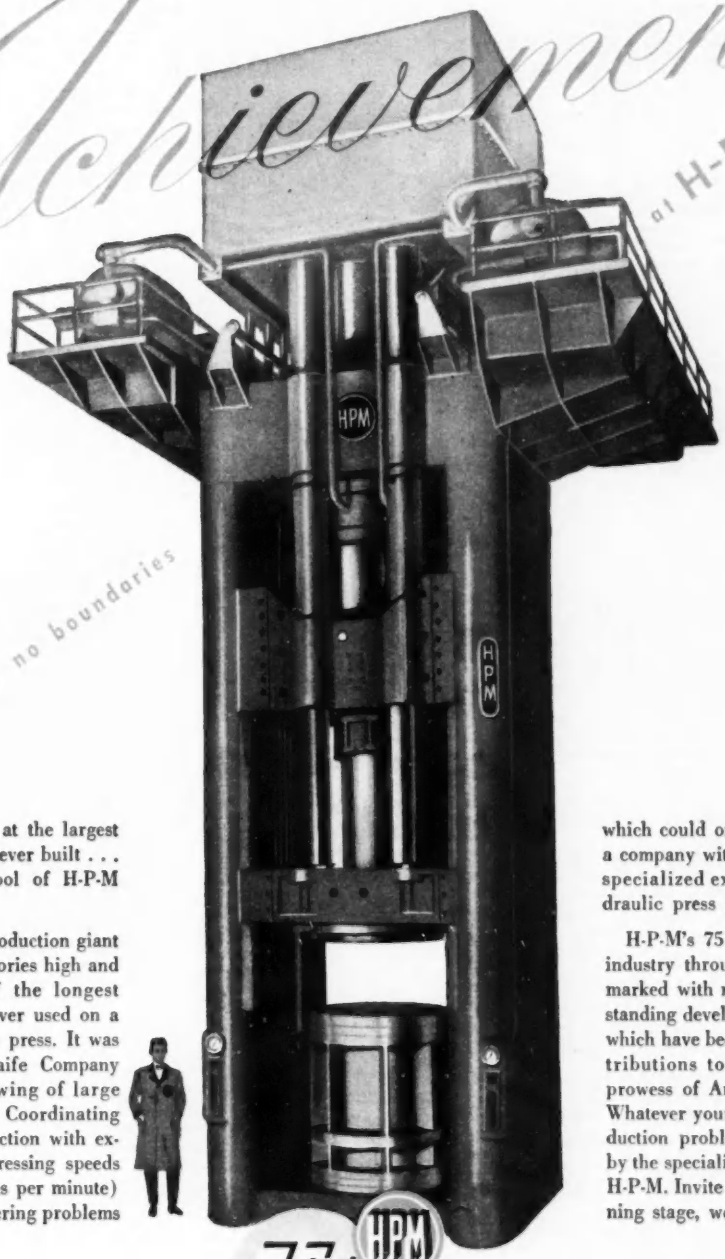
● 1901-1941 Carroll Avenue, Chicago 12, Illinois

Philadelphia • Detroit • Los Angeles

• CONTROL WITH DOLE

Achievement at H-P-M

Recognizes no boundaries



You are looking at the largest press of its type ever built . . . a towering symbol of H-P-M achievement!

This H-P-M production giant is more than 4 stories high and delivers one of the longest strokes (108") ever used on a blankholder type press. It was designed for Scaife Company for reverse drawing of large pressure vessels. Coordinating multiplicity of action with exceedingly fast pressing speeds (up to 200 inches per minute) presented engineering problems which could only be solved by a company with many years of specialized experience in hydraulic press design.

H-P-M's 75 years of serving industry through hydraulics is marked with milestones of outstanding developments like this, which have been important contributions to the production prowess of American industry. Whatever your machine or production problem, you'll profit by the specialized experience of H-P-M. Invite us in at the planning stage, won't you?

HPM

75th YEAR

SERVING INDUSTRY THROUGH HYDRAULICS

THE HYDRAULIC PRESS MFG. COMPANY

2006 MARION ROAD
MT. GILEAD, OHIO, U. S. A.

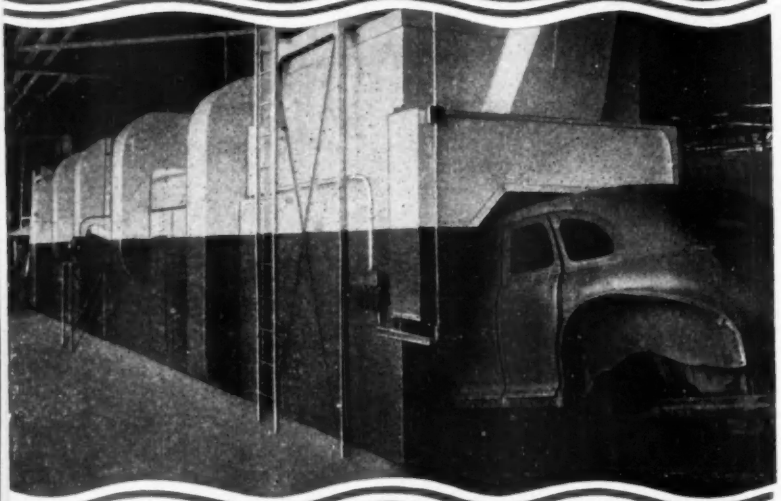
Builders of Presses for the Metal Working & Processing Industries • Plastics Molding Presses • Die Casting Machines • Hydraulic Pumps, Valves & Power Units

Engineered to your production

Schmieg

CENTRI MERGE

OVENS



Any Size, Shape, Type

FOR EVERY KIND OF WORK

Whatever your requirements, Schmieg drying and baking ovens are designed and engineered to give you highest efficiency at lowest operating and maintenance cost.

Conveyor or box type, for any installation arrangement, compactly designed to save valuable floor space, engineered to fit smoothly into your production plan, Schmieg ovens *make it easy* for you to turn out the very best paint jobs.

Schmieg ovens give you automatic temperature control, insure against hot spots, are meticulously insulated to prevent heat loss. Every operating essential has been carefully designed and engineered to enable you to safeguard product quality.

So we say—No matter what size, shape or type of oven you may need, for any kind of work, Schmieg ovens give you most for your money.

Consult Schmieg engineers today.

THE best AIR PURGE is CENTRI MERGE

Schmieg INDUSTRIES INC.

Engineers & Manufacturers

[illegible] PIQUETTE AVENUE • DETROIT 2, MICHIGAN

NEW PRODUCTS

For additional information please use coupon on page 62

(*Continued from page* 80)

K-55—Top Cylinder Lubricator

A lubricator unit for constant upper cylinder lubrication has been exclusively engineered for use with Whiz Motor Rythm, it has been announced by the R. M. Hollingshead Corp., Camden, N. J.

The atomizing principle behind the unit, designed and manufactured by White Automotive Products, Inc., provides automatically controlled top-cylinder lubrication in the combustion area of car, truck and tractor engines. This lubricator vaporizes the lubricant at the immediate point of entry into the manifold air-intake.

Hollingshead Whiz Motor Rythm lubricator.

The Motor Rythm White Lubricator consists of a quart-size glass jar with a metering device on top, and copper tubing for connecton to the manifold air-intake. The lubricator is mounted on the firewall under the hood. Motor Rythm is fed and metered to the manifold air-intake through a copper tube. Units are shipped with the rate of flow "pre-set" and fixed.

(*Turn to page* 84, *please*)

N·A·X HIGH-TENSILE STEEL

means less weight with no loss of strength or quality

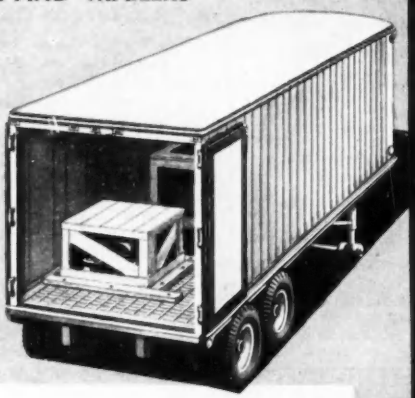
FOR BUSES . . .

The greater strength and toughness of N-A-X HIGH-TENSILE steel permits reductions of up to 25% in section without sacrificing durability or safety of product.

TRUCKS . . .

Through the use of this low-alloy, high-strength steel, with its enhanced resistance to corrosion, less dead-weight in military and civilian transportation equipment means greater payloads and longer life.

. . . AND TRAILERS



N-A-X HIGH-TENSILE steel, with its high degree of cold formability and excellent welding properties, permits a manufacturer of transportation equipment to fabricate it with the ease of mild carbon steel.

These few examples illustrate the use of N-A-X HIGH-TENSILE steel in transportation equipment. By utilizing its increased strength and toughness—its greater resistance to corrosion, abrasion and fatigue—its excellent response to fabricating and welding—you can make more products from the same tonnage of steel . . . an important contribution to conservation.

MAKE A TON OF GREAT STEEL DO FURTHER. Specify— N·A·X HIGH-TENSILE STEEL . . . And "MAKE YOUR PRODUCT LAST LONGER"

SCRAP

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

NEW PRODUCTS

For additional information regarding any of these items, please use coupon on page 62

(*Continued from page 82*)

K-56—Universal Joints

Announcement of a line of wide angle needle-bearing universal joints for use with power take-offs has been made by the Spicer Manufacturing Div., Dana Corp., Toledo, Ohio. These 1000 Series Spicer universal joints are designed for the installation of power take-offs, winches, pumps, etc. The line includes a complete unwelded assembly set with end yokes; single joint end yoke type; slip joint type; single joint and tube for use with midship bearing and accessories.

A major feature in the 1000 Series Spicer universal joint line is the standard patented Spicer Blowout-Proof seal between the journal and each bearing. The cork washer of this seal is surrounded by the metal cork retainer, protecting the seal from road dirt. It also encases the seal so that when a pressure lubricating gun is applied the cork seals are retained in place and protected against blowout and loss of lubricant.

Spicer 1000 Series universal joint.

K-57—Skid Control

The Gyro Skid Control manufactured by the Safety Auto Stabilizer Co., Los Angeles, Calif., is now available. It is said to harness the forces resulting in skids, and balances them by its countercentrifugal force—even in blowouts, stabilization is maintained, preventing side skids—automatic lateral action dampens all horizontal vibration.

K-58—Torque Converter

The Torcon Corp., Ashtabula, Ohio, has announced the addition of the Model 17-K single-stage, three-element type unit to the standard line of Torcon torque converters. Combining a hydraulic torque converter and hydraulic coupling in a single unit, it provides automatic transmission for shovels and cranes, oil well rigs and service equipment, logging machinery, locomotives, rail cars, road machinery, material handling devices such as lift trucks and front end loaders, etc. This model can be used with gasoline or Diesel engines rated up to 300 hp and is roller-bearing equipped.

The Torcon converter has a variable torque ratio up to 3 to 1. When the torque ratio reaches 1 to 1, the reaction member is free wheeled and the unit acts as a hydraulic coupling.

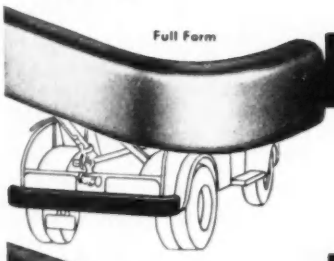
Major elements of the Torcon unit consist of the converter pump, converter turbine and reaction member—each is a single-piece aluminum casting. Piston-ring type oil seals, which contain the oil in the working elements, permit passage of a small amount of

(*Turn to page 88, please*)

NASH BODY-GARD BUMPERS are 3 ways better!

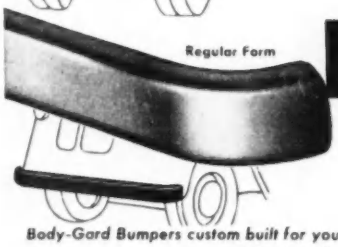
Body-Gards PROTECT

High tensile steel and channel type construction combine maximum protection, strength and durability with minimum weight.



Body-Gards FIT

To fit your vehicle, front or rear, Body-Gards are made in any length you specify, in any one of the three styles shown and in five face widths.*



Body-Gards SAVE

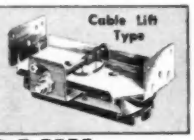
By their economical cost and by the repair bills they prevent, Body-Gards help reduce vehicle operating costs.

*Five Face Widths 3½", 4½", 5½", 6" and 6¾" wide.

Body-Gard Bumpers custom built for your truck, bus or trailer are easy to order. Write for information, now

Ask For Details on NASH TIRE CARRIERS

For Original Equipment or Replacement. The complete Nash line includes the right tire carrier for every type of commercial vehicle.



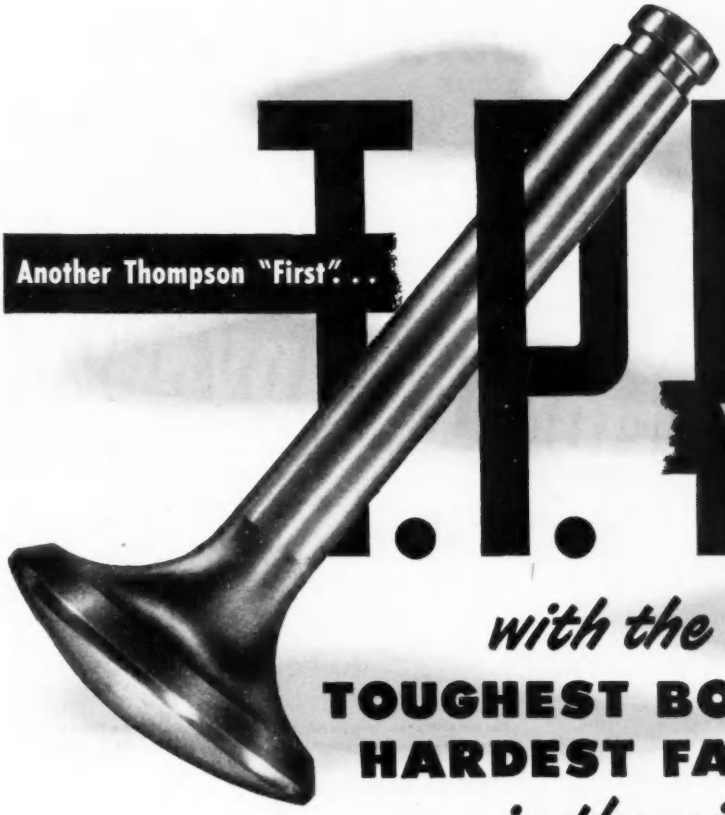
NASH BROS. COMPANY

2125 DEWEY AVENUE • EVANSTON, ILLINOIS

SEE YOUR EQUIPMENT SUPPLIER OR WRITE DIRECT FOR FOLDER

Another Thompson "First"...

T.P.M. VALVES



with the TOUGHEST BODIES, HARDEST FACES *in the air*

"Hundreds more service-hours" . . . "longer time between valve replacement" . . . "no signs of burning" . . .

Airline operators report these benefits from the new Thompson T.P.M. Valves on their Pratt & Whitney Aircraft R-4360 Engines.

A new harder alloy on the head and face, plus time-proved sodium-cooling principles, gives the new Thompson T.P.M. Valve even greater reliability in service. It's another reason why Thompson Valves are preferred by engine builders and airline operators. It's another Thompson "first" . . . the first new development in aircraft valve material in 15 years.

VALVE DIVISION

Thompson Products, Inc.

EUCLID, OHIO

YOU CAN COUNT ON THOMPSON FOR ENGINEERING LEADERSHIP

Bendix Products Presents

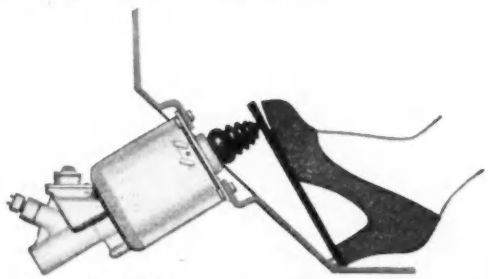
TREADLE-VAC

A REVOLUTIONARY ADVANCE

The old fashioned, long travel, high brake pedal requiring a lifted foot and leg power pressure can now disappear from the floor boards of modern cars.

Now passenger car manufacturers can offer braking that is comparable to the accelerator in operating ease, convenience and fatigue-saving comfort for the driver. Treadle-Vac gives an entirely new type of passenger car brake control, using the proved operating principles of the Bendix*Hydrovac,* the world's most widely used power brake. An easy ankle movement, much like working the accelerator, is all the physical force needed for normal braking. And what is equally important, the brake treadle can be on about the same level as the accelerator, so that the foot moves from one control to the other by simply pivoting on the heel. Thoroughly proved by years of testing, this latest development of Bendix engineers gives car manufacturers an opportunity to offer their customers *for the first time* the easiest, safest, and smoothest braking that can be imagined. From the standpoint of both appearance and performance, it is one of the finest new selling features available in years. Get the detailed story of this greatest advance in passenger car control since four-wheel brakes.

*REG. U. S. PAT. OFF.

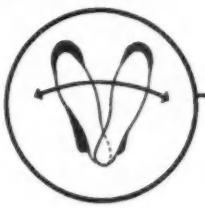


With Treadle-Vac the heel never needs to leave the floor. The low pedal, short travel and toe touch action mean that the swing from accelerator to brake can be made merely by pivoting on the heel.

BENDIX · PRODUCTS DIVISION · **SOUTH BEND**

Bendix AVIATION CORPORATION

Export Sales: Bendix International Division, 72 Fifth Ave., New York 11, N.Y. • Canadian Sales: Bendix-Eclipse of Canada, Ltd., Windsor, Ontario, Canada



Braking with Treadle-Vac is not only easier, but it is faster as well. Shifts from "go" to "stop" control are made in one fourth less time. This can mean five feet shorter stopping distance at 60 miles per hour.

IN PASSENGER CAR BRAKING!

For the First Time—

—A Low, Light-pressure Brake pedal

Comparable to the

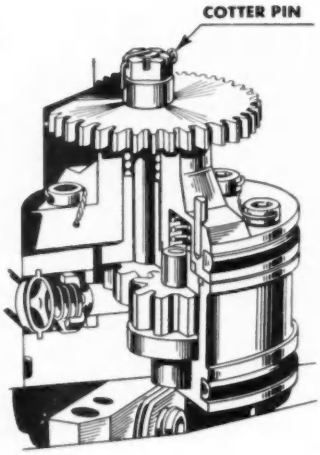
Accelerator in Operating Ease!

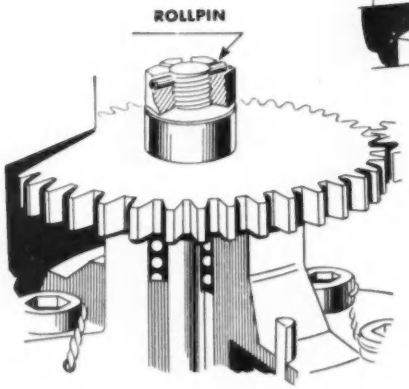
(*Advertisement*)

Fastener Problem of the Month

Vibration-proof Locking for Castellated Nut — **February, 1952**

PROBLEM: The presence of oil, space limitations and temperature considerations made it necessary for Hamilton Standard Division, United Aircraft Corporation, to use a castellated nut to retain a drive gear on a high pressure pump shaft. Cotter pins were used to lock the nut—but vibration caused several locking pin failures. Broken cotters and subsequent loosening of the pump drive gear could not be tolerated—a more satisfactory locking device had to be found.





SOLUTION: Hamilton Standard engineers decided to use self-locking Rollpins, the pressed-fit pins with chamfered ends. Rollpins fit flush, with no exposed ends. They were found to be vibration-proof, because of the constant pressure they exert against the hole walls. In addition, Hamilton Standard's testing disclosed that Rollpins were far more rugged than cotter pins — and subsequent service experience has borne this out.

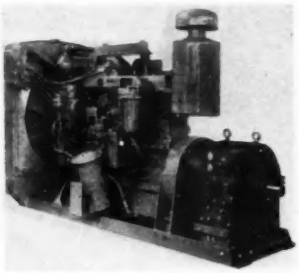
YOU may be able to use Rollpins in a similar application—or to replace rivets or set screws . . . to pin or key gears, pulleys . . . as locating dowels or shafts, or in many other ways. Rollpins generally do pinning jobs faster and reduce assembly costs. Write ESNA for complete information and a free sample assortment of Rollpins — or send your fastening problem direct to ESNA engineers. Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, N. J. Dept. R3-25.

ROLLPINS
. . . many lengths and diameters

NEW PRODUCTS

For additional information please use coupon on page 62

(*Continued from page* 84)



Torcon, three-element torque converter, Model 17-K.

oil to provide bearing lubrication. This controlled leakage drains into the oil reservoir which is integral with the converter housing. The bearings are designed so that sprocket or gear drive can be attached to the output shaft.

The chain-driven oil circulating pump is mounted on the base plate. Converter uses standard SAE No. 10 motor oil and incorporates built-in oil filter, temperature and pressure gauges. It can be modified to meet the specific requirements of individual applications.

K-59—Ring Sets

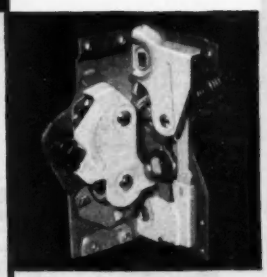
Complete ring installations for Diesel engines of large bore can now be obtained from Wilkening Manufacturing Co., Philadelphia, Pa. These complete engineered sets are said to exploit fully the great potentialities of latest ring designs, especially the flexible or conformable oil rings, for each particular type of big-bore engine. Each set has been worked out and applies to only one model of engine. The sets are made up in cylinder units so they can be ordered for any of the multiple-cylinder combinations in service.

K-60—Puncture-Sealing Inner Tube

A puncture-sealing inner tube of improved Butyl rubber having greater air retention qualities than its natural rubber predecessor has been put out by Goodyear Tire & Rubber Co., Akron, Ohio.

Important features of the tube, ac-

(*Turn to page* 90, *please*)



Automobile door lock assembly, one of the many items made by Hancock with the help of Clearing presses.

VALUE at a FAST PACE

In Jackson, Michigan, the Hancock Mfg. Co., producers of automobile hardware, like the way this bank of Clearing presses stick to their jobs. Long experience with high-volume, high-tempo, production runs has made Hancock a pretty good judge of press stamina. That's why they chose the presses in this picture.

Their Clearings are giving steady performance at high speed with practically no maintenance. Die regrinds are infrequent because Clearing's precision slide action holds die wear to a minimum.

Advantages like these mean a lot to Hancock . . . and to you, too. For production your best choice is Clearing.

CLEARING MACHINE CORPORATION

6499 WEST 65TH STREET ★ CHICAGO 38, ILLINOIS

HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

NEW PRODUCTS

For additional information regarding any of these items, please use coupon on page 62

(*Continued from page* 88)

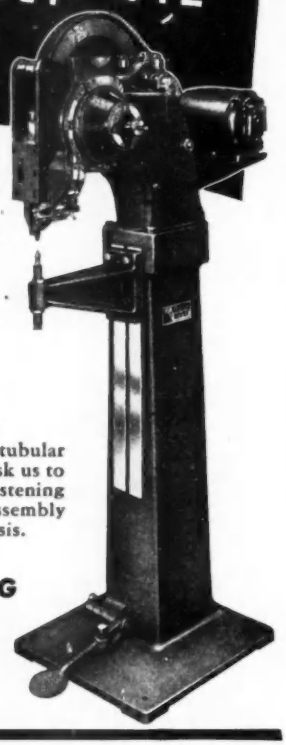
cording to Goodyear, include its Butyl sealant material of proper consistency to seal punctures. Developed only after long research, the sealant is sufficiently stabilized to maintain its position in the tube at high speeds and high temperatures.

The sealant also permits the tube to meet all puncture sealing requirements without excessive weight or changes in balance under operating conditions, the company points out.

Still another advantage is the tube's oversize feature, present also in its natural rubber predecessor. This tends to keep the tube in compression when inflated, thereby permitting it to compress, when punctured. around the hole left by the puncturing object.

Coupled with action of the sealant, this achieves what the company terms "double seal" action.

Chicago RIVET "912"
AUTOMATIC RIVET SETTER
CUTS COSTS 3 WAYS



1 FASTENS FASTER . . .
Only the speed of the operator limits the 912's riveting speed. Completely automatic. A push on the foot pedal automatically feeds, inserts and clinches the rivet.

2 DOES WORK OF SEVERAL MACHINES
Quick change rotary hopper and raceway makes the 912 adjustable in 5 to 10 minutes to set different size rivets. Adjustable anvil height and 12-inch throat provide further versatility.

3 SAVES ON MAINTENANCE . . .
The 912 is massively built to stand the shocks of constant use and is designed for quick, easy servicing and parts replacement.

If your assembly calls for 3/16" steel tubular rivets or smaller, of ¾" lengths or less, ask us to show you how the 912 can cut your fastening costs. Send a sample of your problem assembly (or blueprint) for a free fastening analysis.

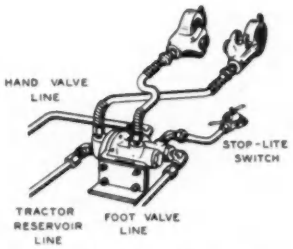
FREE CATALOG
contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 Chicago Automatic Rivet Setters.

Chicago Rivet & MACHINE CO.
961 West Jackson Boulevard, Bellwood (Chicago Suburb) Illinois
Branch Factory: Tyrone, Pa.

K-61—Tractor Breakaway Valve

Wagner Electric Corp., St. Louis, Mo., has announced the availability of a tractor emergency valve that affords drivers and tractors complete protection in the event of a breakaway. This safety device automatically seals the tractor air system when the trailer is disconnected, providing protection from possible mishap caused by; improper connection, damaged air hose, loss of air in trailer system or complete breakaway.

Applicable to either straight-air or air-over-hydraulic brake systems. Unit measures six-in. long by four-in. high by five-in. wide and weighs approximately 7½ lb. Mounts conveniently with four bolts.



Wagner tractor emergency value.

K-62—Metal Cleaner

Magnus Chemical Co., Garwood, N. J., has announced a cleaner for all kinds of metal parts, Magnus 751.

It is claimed to be safe for all metals. It is non-inflammable. Magnus 751 can be used in either hot or cold solution and is followed by a cold water rinse after the cleaning period.

One use of this cleaner is for the removal of carbonized oil and gums from aircraft engine parts, Diesel engine parts and other units. It is also recommended for cleaning carburetors, fuel pumps, pistons, rocker arm assemblies, rear and transmission parts, brake parts, etc.

for **BORON STEELS**

GRAINAL TREATMENT
meets new specifications

To meet the requirements of boron-treated steels, use Grainal Alloys—metallurgically engineered multiple-element ferro-alloys containing boron.

The combination of elements in these alloys is *most effective* and produces *extremely uniform* results in raising the hardenability of very low alloy steels.

Nominal compositions of three grades available:

Vanadium Grainal No. 1		Vanadium Grainal No. 6		Grainal No. 79	
Vanadium	25.00%	Vanadium	13.00%	Aluminum	13.00%
Aluminum	10.00%	Aluminum	12.00%	Titanium	20.00%
Titanium	15.00%	Titanium	20.00%	Zirconium	4.00%
Boron	0.20%	Boron	0.20%	Manganese	8.00%
				Boron	0.50%
				Silicon	5.00%

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

MAKERS OF ALLOYS
VANCORAM
CHEMICALS AND METALS

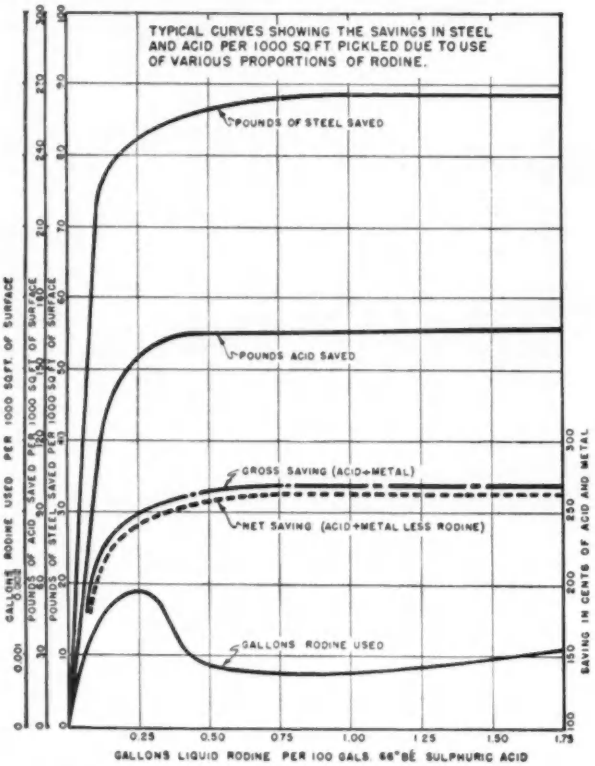
AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: EFFICIENT PICKLING WITH "RODINE"®

A. SAVINGS POSSIBLE WITH "RODINE"


TYPICAL CURVES SHOWING THE SAVINGS IN STEEL AND ACID PER 1000 SQ FT PICKLED DUE TO USE OF VARIOUS PROPORTIONS OF RODINE.
POUNDS OF STEEL SAVED
POUNDS ACID SAVED
GROSS SAVING (ACID+METAL)
NET SAVING (ACID+METAL LESS RODINE)
GALLONS RODINE USED
GALLONS RODINE USED PER 1000 SQFT. OF SURFACE
POUNDS OF ACID SAVED PER 1000 SQ FT OF SURFACE
POUNDS OF STEEL SAVED PER 1000 SQ FT OF SURFACE
SAVING IN CENTS OF ACID AND METAL
0.25
0.50
0.75
1.00
1.25
1.50
1.75
GALLONS LIQUID RODINE PER 100 GALS. 66°BÉ SULPHURIC ACID

B. TYPICAL APPLICATION OF "RODINE"

Pickling shell cases in uninhibited muriatic or sulfuric acid contributes to their embrittlement and makes it difficult to draw them without breakage. By adding a small amount of "Rodine" to the pickle bath, embrittlement is suppressed and more than enough acid is saved to pay the costs of the inhibitor.

CHEMICALS ACP PROCESSES WRITE FOR DESCRIPTIVE FOLDER ON "RODINE" AND INFORMATION ON YOUR OWN PICKLING PROBLEM. CHEMICALS ACP PROCESSES

Machinery News

(*Continued from page 56*)

"Fisher then quoted a price to the Government. The price, however, was so much higher than that which Bullard charged for the identical machine that the entire project was held up for six months.

"Eventually the decision was made to go ahead. But then a re-survey of the situation, which had changed in the meantime, indicated that 757 42-in. vertical turret lathes were more than the defense program would need. Whereupon the Bullard subcontract to the Fisher Body Div. was cancelled."

Thus Mr. Berna has cited just one instance of what happens in a defense program.

Guy Hubbard has become associated with Bryant Machinery & Engineering Co., Chicago, Ill., as assistant general sales manager. His responsibilities include advertising, publicity and sales promotional activities.

Gear Index

The American Gear Manufacturers Association index figure for November, 1951, is 530 per cent of the base period 1935-39. November, 1950, was 554.9. Average for 1950 was 457.2.

Cincinnati Milling Gets Large Pool Tool Order

Cincinnati Milling & Grinding Machines, Inc., of Cincinnati has been awarded a machine tool pool order totaling more than $165 million from General Services Administration. The order, said to be the largest of its kind ever placed, calls for production of 9576 machine tools of many types.

Machine Tool Index

Latest figures from the National Machine Tool Builders' Association show that the new order index for December, 1951, is 416.8 per cent of the base 1945-47. This compares with an index of 330.5 in November. Foreign orders have dropped 12.4 per cent from November to an index of 16.6 per cent for December.

Shipments for December are up 27.9 per cent over the previous month to a year high of 253.9 per cent. The ratio of unfilled orders to the production rate has decreased to 18.7 to 1.

(*Turn to page 96, please*)

Metal Muscles for Modern Farmers

Push-button farming — with hydraulic tubular steel cylinders replacing weaker, less efficient human muscles — is but one of the many opportunities for improving design of plows, planters, drills, mowers, cultivators and other farm equipment, with OSTUCO Tubing.

Designers and engineers in the farm equipment industry, like those in many other fields, are finding OSTUCO Tubing ideal for cylinders, levers, handles, fuel lines, axles, spacers, bushings, bearings, and exhaust parts, to mention but a few of the applications.

They like OSTUCO Tubing for flexibility in design, great strength, light weight, good machinability, smooth finish, high quality, low cost.

We cannot always promise early delivery estimates on new civilian orders, because of military demands, but it will pay you to consult our experienced engineers about OSTUCO Tubing when redesigning your products to meet future competition.

From Your Blueprint . . . to Your Product
OSTUCO TUBING
Tapering • Swaging • Flanging • Bending
Upsetting • Expanding • Reducing • Beading
End closing • Spinning • Drilling • Slotting
Notching • Flattening • Shaping • Trimming
Threading • Angle Cutting • And Many Others

THE OHIO SEAMLESS TUBE COMPANY
Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing
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OSTUCO SHELBY OHIO

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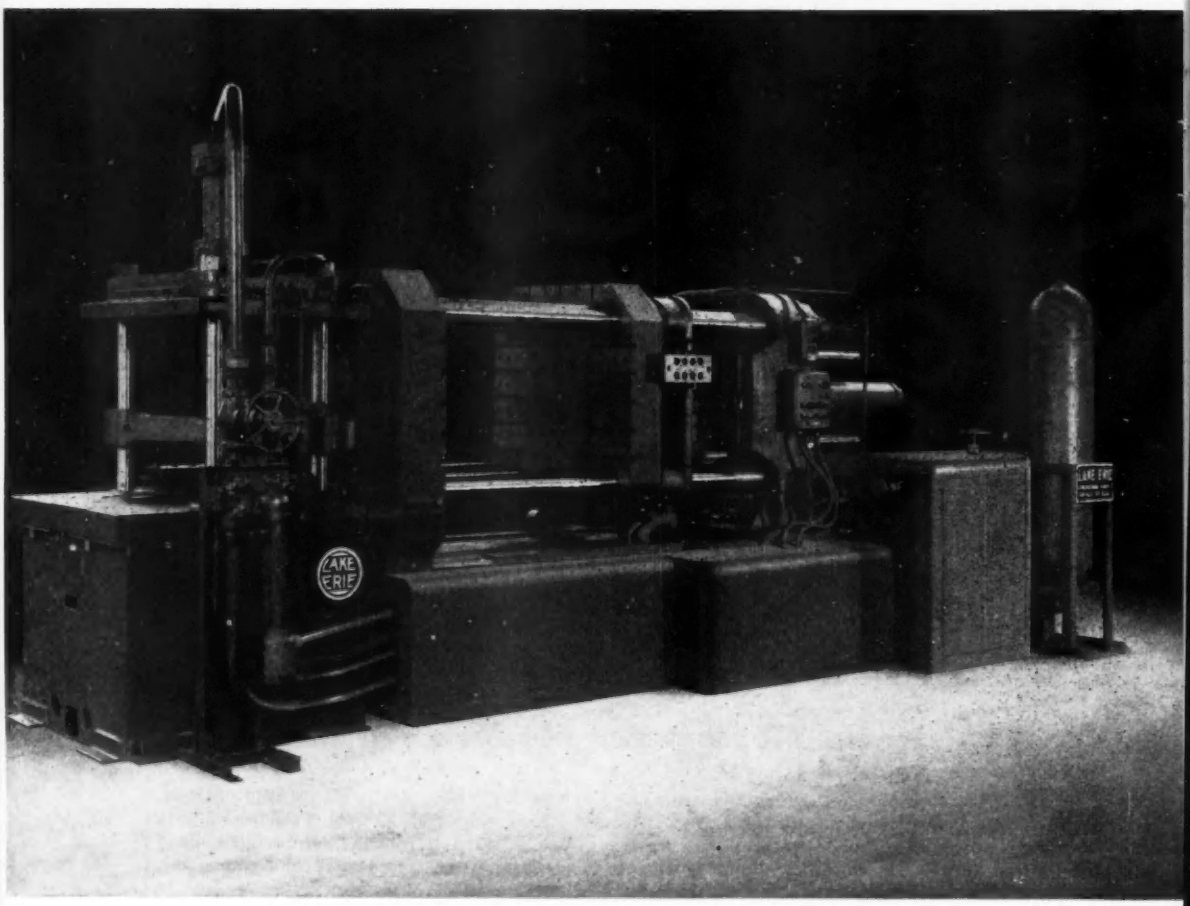
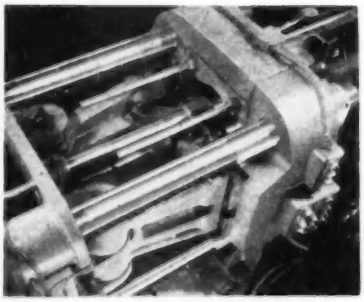
Revolutionary New Answer



Model H-80. Hydraulically operated. 800 ton locking pressure. Push button controlled.

Lake Erie Die Casting Machines set new standards in hourly production and finished casting costs



The "Wedge Cam Toggle" is an exclusive Lake Erie Engineering design.

"WEDGE CAM TOGGLE" The revolutionary Lake Erie "Wedge Cam Toggle" has provided a new standard of comparison for increased die casting production. This self-compensating toggle clamp automatically takes up clearances in the dies due to contraction and expansion of the molds during production or shut-down periods, and, at the same time, engages and disengages easily without binding. This is accomplished by the use of a circular cam contact surface together with rolls which guide the toggles during engagement and disengagement. The toggle action is actuated by a hydraulic cylinder which provides smooth, rapid opening and closing.

"PRESSURE-PAC" This patented unit consists of automatic pressure booster in the hydraulic circuit between the accumulator and the injection cylinder. It provides the necessary pressure to feed the shrink or compress the porosity at the time of solidification of the metal. The standard unit is arranged for 2-to-1 pressure increase. Special units are available for higher pressure ratios.

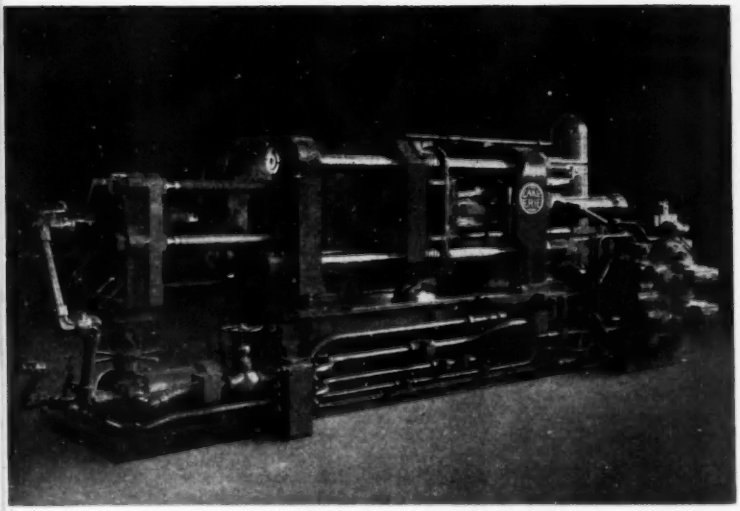
To Die Casting Problems

by LAKE ERIE ENGINEERING CORP. BUFFALO, N.Y. U.S.A.

... these new die casting machines have increased production 15% to 25%

Lake Erie's patented "Wedge Cam Toggle" and "Pressure-Pac" injection unit provide the industry with the first major improvements in die casting machines in many years. In addition to these two *exclusive* contributions to improved production, Lake Erie Die Casting Machines incorporate a number of other engineering advancements—all of which combine to give you die casting equipment which through its increased earning power makes other machines obsolete.

These industry-proven Lake Erie Die Casting Machines are available in 10 models, ranging from 100 to 1000 ton capacity and for casting all the usual non-ferrous metals and alloys.



With all shrouding removed the clean, sturdy construction of Lake Erie Die Casting Machines is self-evident. All parts easily accessible.

OPERATING FEATURES

- **Patented "Wedge Cam Toggle"**

  Self-compensating adjustment for heat expansion.

  Increased hourly production due to positive clamping pressure during each machine cycle.

- **Patented "Pressure-Pac"**

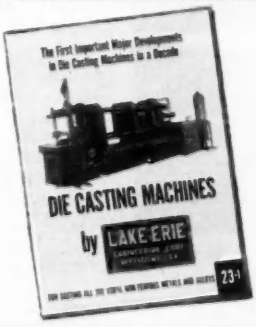
  Feeds the shrink or compresses porosity during solidification of aluminum, magnesium and brass.

  Irons out the skin surface gas lines. Provides denser castings.

Simplified maintenance of all elements including manifold valve block. Faster job set-up. "Jack Screw" pedestal mounting of the injection cylinder facilitates faster change-over from high or low positions of the injection sleeve. Pushbutton control. Automatic continuous cycle or a single cycle operation available. Hydraulic core pulls may be operated on four sides of the platen. Electrical interlock with core-pulls prevents die join.

Write for this Catalog

Illustrations, specifications, application data—all are here in complete detail with full explanation of the patented "Wedge Cam Toggle" and "Pressure-Pac" production advantages.



"Another Lake Erie contribution toward improving industrial production procedures"

LAKE ERIE ENGINEERING CORP.

MANUFACTURERS OF
HYDRAULIC PRESSES AND SPECIAL MACHINERY

General Offices and Plant:

509 Woodward Avenue, Buffalo 17, New York

LAKE ERIE HYDRAULIC PRESSES are available in any size ... standard, modified and special design—horizontal and vertical types—for Metal Working—Plastics Molding—Forging—Metal Extrusion—Processing—Vulcanizing—Laminating—Stereotype Molding—Die Casting—Briquetting—Baling—Special Purpose.

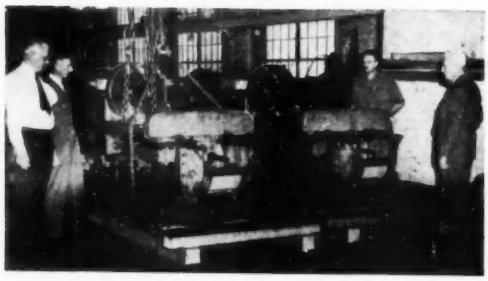
Machinery News

(*Continued from page 92*)

Mission Surveys Japan For Machine Tools

A special machine tool mission has gone to Japan to determine whether idle machine tool building capacity there can produce the type, sizes, and qualities of tools required by the U. S. defense program. Head of the mission is N. B. Clark of the NPA Metal Working Equipment Division, who is on leave from his position as export manager for Warner & Swasey Co. Two other NPA consultants who are members of the mission are Charles De Vlieg, president of the De Vlieg Machine Company of Ferndale, Mich., and Howard Kellogg, Director of engineering purchases for Ford.

Machine Tool Subcontractors Begin Deliveries



Shown here are the first two Gisholt Simplimatic automatic lathes which were built by the Cameron Can Machinery Co., Chicago, Ill. Basic machines are completely built up at Cameron and then shipped to Gisholt for tooling and testing.

JOHNSON *Tappets*

are made by Tappet Specialists

Thorough and complete attention by the entire Johnson Tappet organization to these important working parts of your engines assure you of maximum tappet life and performance.

SELF LOCKING TAPPET SCREW

Originated by Johnson this diaphragm type Self Locking Tappet Screw is operating successfully in millions of cast iron and steel tappets.

"Tappets Are Our Business"

JOHNSON JP PRODUCTS INC.

MUSKEGON, MICHIGAN

Western Plant Completed

A machine shop providing 55,000 sq ft of floor space, the largest structure in a three-building $600,000 expansion project underway at the Westinghouse Electric Corporation's western headquarters plant at Sunnyvale, Calif., has recently been completed. The steel and reinforced-concrete building, 281 by 207 ft, boasts fluorescent mercury lamps, filtered sunlight—entering the shop through a special plastic skylight, and a unique method of painting machine tools.

New Plant for Bath

Cyril Bath Machinery Co. has announced that piling orders from manufacturers of jet engines and planes necessitate the construction of a branch plant comprising 50,000 sq ft of additional space. Ground will be broken approximately 30 days after Federal officials grant final financial and material requests for construction. The new plant will be located at Solon, Ohio, a community some 15 miles from the present Bath site in Cleveland. Special rail facilities will be installed by the Nickel Plate Railroad.

The Solon Branch will specialize in defense production of the recently announced Rotary Draw Former.

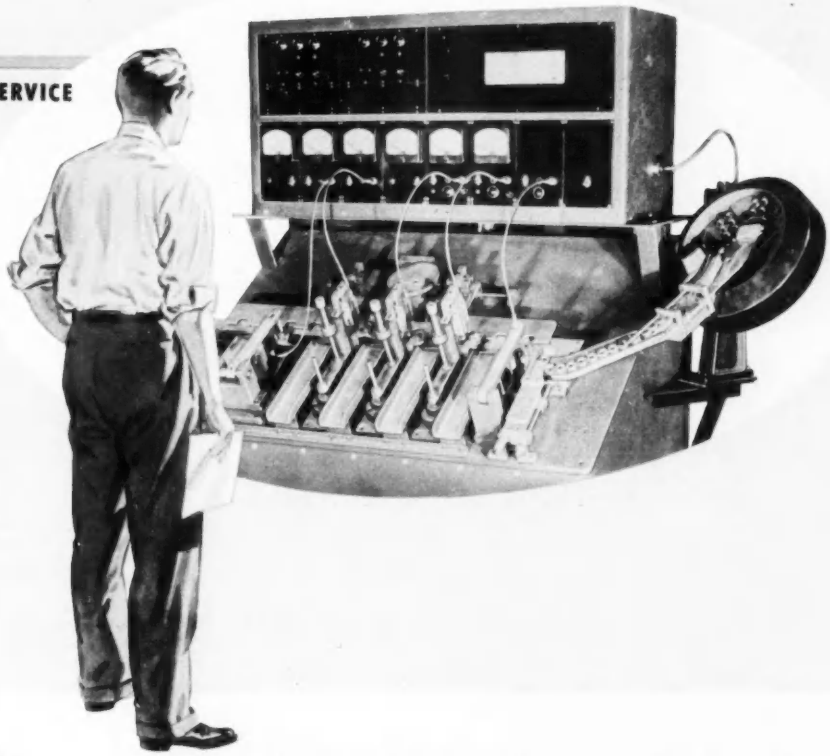
New Stock Registration

New Britain Machine Co. of New Britain, Conn., has applied to the Security & Exchange Commission for registration of 70,000 shares of common stock.

Stock is to be offered at $20 a share to stockholders at the rate of one share for each two held. Proceeds will be used primarily for working capital.

Spicer

SPECIALISTS IN SERVICE



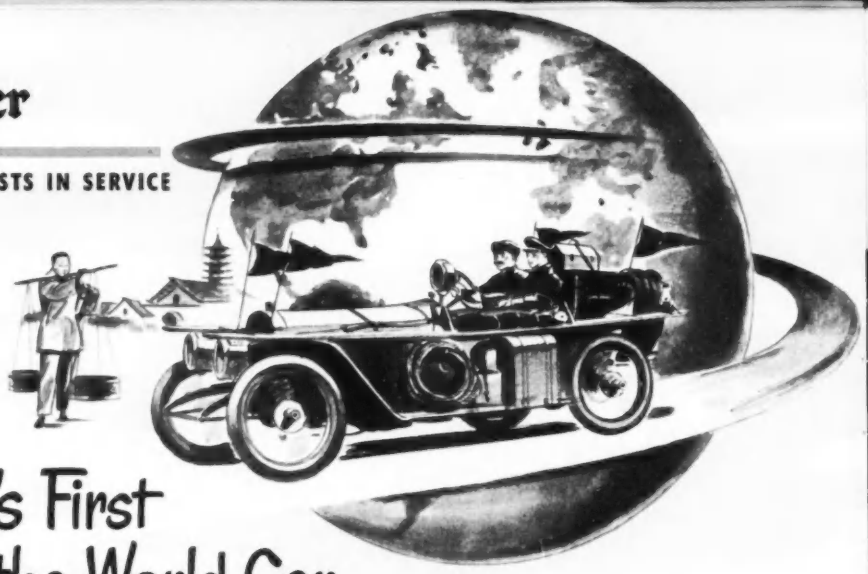
± 5/1 MILLIONTHS ...that's a lot of precision!

Electronics rule the accuracy controls in Spicer production of automotive power transmission units. These Spicer parts are microscopically tested for size, squareness, concentricity and hardness, by "electronic-brain-controlled" automatic inspection equipment. The instruments operate at an electronic frequency of 30 million cycles per second, and automatically measure to the molecular accuracy of plus or minus .000005.

Spicer ability to "feel" and control molecules . . . and all the factors that influence the most meticulous precision requirements... have helped build the 48-year-old Spicer reputation for the highest standard of automotive power transmission equipment in the industry.

Spicer

SPECIALISTS IN SERVICE



The World's First Round-the-World Car

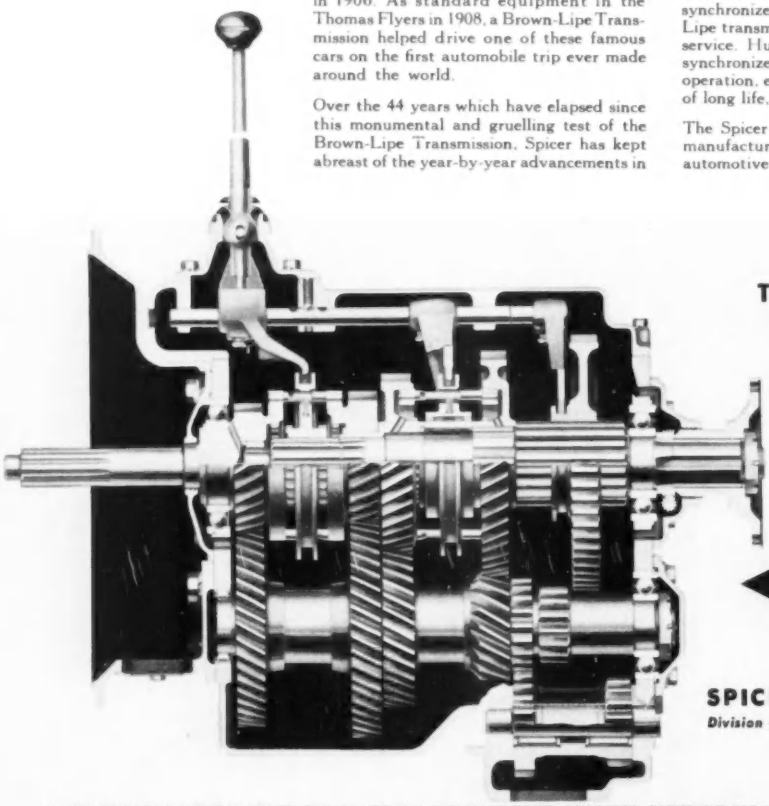
Equipped with a Brown-Lipe Transmission built in the Spicer *Pattern of Precision!*

The first selective type automobile transmission was shipped from the Brown-Lipe factory to the E. R. Thomas Motor Company in 1906. As standard equipment in the Thomas Flyers in 1908, a Brown-Lipe Transmission helped drive one of these famous cars on the first automobile trip ever made around the world.

Over the 44 years which have elapsed since this monumental and gruelling test of the Brown-Lipe Transmission, Spicer has kept abreast of the year-by-year advancements in precision control, to constantly maintain its enviable record of quality production.

Within the last 20 years, Spicer has adapted its synchronized gear-shift principles to Brown-Lipe transmissions for rugged truck and bus service. Hundreds of thousands of these synchronized units now are in heavy-duty operation, establishing outstanding records of long life, economy, and ease of operation.

The Spicer *Pattern of Precision* in every manufacturing step pays off in every Spicer automotive power transmission unit.



The Spicer Brown-Lipe
FULLY-SYNCHRONIZED TRANSMISSION
for Heavy-Duty Truck and Bus Service

48 YEARS OF Spicer SERVICE

SPICER MANUFACTURING
***Division of Dana Corporation* • TOLEDO 1, OHIO**

TRANSMISSIONS • UNIVERSAL JOINTS • BROWN-LIPE AND AUBURN CLUTCHES • FORGINGS • PASSENGER CAR AXLES • STAMPINGS • SPICER "BROWN-LIPE" GEAR BOXES • PARISH FRAMES • TORQUE CONVERTERS • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES

AIRBRIEFS

(*Continued from page 68*)

into being but C. R. hasn't any idea whose going to pay the bill—unless it is C. R. himself!

Another Subsidy Proposal

Following a disastrous battle for Government-subsidized development of prototype transport aircraft, which collapsed through non-support of the industry, airlines and the military, the proponents of the principle have established a lesser goal—Government payment for the testing of existing jet aircraft in simulated airline operation. Latest proposal of the CAA Prototype Advisory Committee is that $1.2 million be appropriated for the testing of the now-shelved Avro Jetliner, a Douglas F3D Skynight fighter and, of course, the ubiquitous North American B-45 that has always figured in the idea. The proposal assumes the following hourly costs of conducting the tests: $750 for the Jetliner, $600 for the Skynight and $1000 for the B-45. The tests would include both airworthiness and operational phases and would cover navigational procedures, traffic control and, of course, operating costs. At the moment, literally everybody is for the idea — Government, airlines, manufacturers, the military and the various trade associations. Only one other segment needs to approve and that is the economy-minded Congress, who must provide the handout.

Broadening the Base

The Defense Production Administration reveals that about two-thirds of the originally-programmed industry facilities expansion has been completed in the airframe field. Nearly one-half of the aircraft engine plan is complete and nearly one-half of the planned expansion of the equipment supply industry is already in place. This is based on the issuance of certificates of necessity from the launching of the program in the fall of 1950 to Dec. 31, 1951. Airframe manufacturers have obtained approval of $36,196,000 worth of new facilities; engines suppliers $136,611,000 and equipment producers $32,381,000. However, the report shows that only about one-quarter of the projected expansion of aluminum production is now in place, and on this program depends much if not all of the aircraft production expansion. In each of these fields, the applicants received authority to write off the cost of two-thirds of their total over a five-year period. The entire program was estimated to cost about $10 billion and as of the first of the year $9.4 billion had been applied for by 3523 different companies. Obviously, the base is broadening quickly and widely.

HERE'S A FUND OF KNOWLEDGE TO HELP YOU . . .

Ordnance

Aircraft

Transportation

DEFENSE production spells tougher materials and new materials such as high temperature alloys and super stainless steels. Such metals and the tolerances and finishes required by Armed Services specifications bring new problems to plants experienced in civilian production.

D. A. Stuart Oil Co. has a tremendous backlog of experience in helping solve defense machining problems through correct application of the proper cutting fluids.

This fund of information, preserved and developed, is available to help you if you are engaged in defense work.

Use Stuart as your clearing house for helpful information.

WRITE TODAY, or call our nearest office outlining your specific problems.

D. A. Stuart Oil Co.

2733 S. Troy St., Chicago 23, Ill.

The BUSINESS PULSE

(*Continued from page* 54)

contains many wasteful and unnecessary features and promised to subject all items, military as well as non-military, to the closest scrutiny. Senator Paul H. Douglas, for example, stated that in his opinion expenditures could be trimmed by as much as $7 billion, with $4 billion coming from military items. Senator Burnet R. Maybank, who is Chairman of the Senate Banking and Currency Committee, asserted that the "ax must go deep" and urged that at least $3 billion in saving be effected. In testifying before the Joint Congressional Economic Committee, Dr. Edwin G. Nourse, who resigned his position as Mr. Truman's top economic adviser two years ago because of his belief that spending programs were unreasonable, advised Congress to make "a substantial cut" in proposed outlays. He declared that the heavy military program contains great danger of an inflationary boom in later 1952 and in 1953 and a deflationary crash in 1954 or 1955.

Planned disbursements are heavily weighted on the side of military activity. About 76 per cent of the total is earmarked for what the President terms "major national security programs." In addition to direct military expenditures, such things as foreign-aid programs, atomic-energy development, civil defense, and economic stabilization are included under this heading. The largest single item, totaling $52 billion, is for military services. This compared with an anticipated outlay of $40 billion in the current fiscal year. Some $14 billion of the military total is scheduled for the procurement of aircraft. Despite the magnitude of this procurement total, funds will not be adequate to provide the 143 wings which Air Force spokesmen have called for.

Large Non-Defense Expenditures

Proposed non-defense expenditures are scheduled at $20.3 billion. In his budget message Mr. Truman called attention to the fact that this is some nine per cent below similar outlays in fiscal 1950. Critics were quick to point out, however, that the total is very close to the high level of the current year and observed that certain programs within the non-defense total are to be stepped up. Increased spending is planned for such things as educational programs and the support of farm prices.

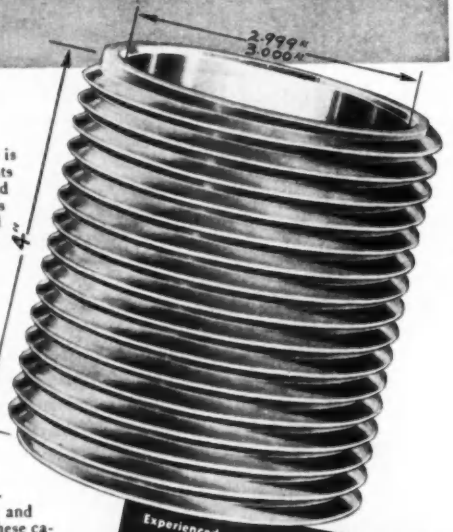
While many Congressmen expressed their determination to eliminate alleged duplications and "frills," it is widely doubted that Congress will actually cut new Federal spending to any great extent. The Government will start the next fiscal year with almost $73 billion in unused spending authority—a backlog from previous years. This, even if Congress were to slash large amounts from particular requests for appropriations, the effect would probably be felt not so much in fiscal 1953 as in future years.

Budget Implications Inflationary

The implications of the budget are, by general agreement, inflationary. In the next few months, however, it is doubted that any great increase of inflationary pressure will be felt. The second half of the Government's fiscal year, which coincides with the first half of the calendar year, is a period of heavy tax receipts. Mr. Truman estimates the deficit for the current fiscal year at a figure which has already been approximately reached. This suggests a rough balance between budgeted expenditures and receipts between now and the end of June. As to

(*Turn to page* 102, *please*)

Expertly machined
HARDENED & GROUND PARTS



THE sleeve shown here is a large piece and represents an exacting job—the kind we handle well. It calls for accurately hobbed threads over the full length . . . a polish-ground bore concentric with the pitch diameter of the threads . . . tolerances that challenge our ingenuity and skill.

Brown Hardened and Ground Parts have served the automotive industry for more than 40 years. In that time we've gained invaluable experience in precision machining, scientifically-controlled heat treating and micro-finish grinding. These capable facilities are at your command. Merely send us your prints; write or wire your requirements.

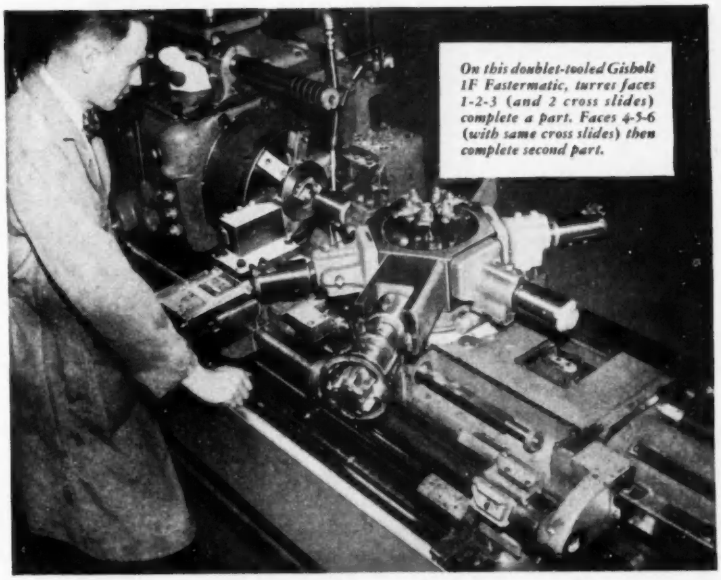
Henry W. Brown
PRESIDENT

Experienced production on . . .
King Pins • Shackle Bolts • Shackle Pins
Broke Anchor Bolts • Countershafts
Idler Shafts • Stub Axle Shafts
Steering Ball Bolts
Beam Balls and Bolts • Wheel Studs
5th Wheel Rocker Shafts
Water Pump Shafts
. . . anything in the hardened and ground line, of any analysis steel, up to 4¼" diameter.

THE BROWN CORP.
213 BELLEVUE AVE. SYRACUSE, N. Y.

C. H. Ehlert, 3407 Clarendon Rd., Cleveland • N. F. Spring, 4719 Balfour Rd., Detroit • R. C. Sanderson, 5900 N. Clark St., Chicago • Harry J. Windmiller, 1704 Carlton, Fort Worth • Johns William & Co., 1440 N. Spring St., Los Angeles, Calif. • John D. Hunt, 1811 S.E. Yamhill St., Portland, Ore.

HOW DUPLICATE TOOLING... AND A FASTERMATIC...



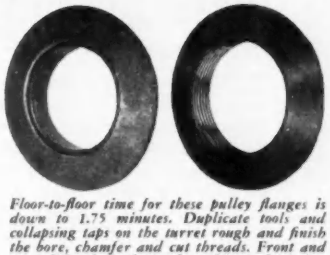
On this doublet-tooled Gisholt 1F Fastermatic, turret faces 1-2-3 (and 2 cross slides) complete a part. Faces 4-5-6 (with same cross slides) then complete second part.

doubled production!

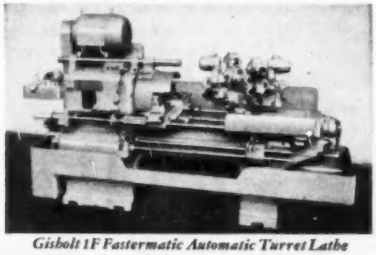
The time *and unit cost* for machining these cast iron pulley flanges were cut in half when the Fastermatic with double tooling took over the job.

Just three turret faces were needed to complete the machining and threading on each part. Therefore, tooling is repeated on the other three turret faces so that *two* parts are finished with each revolution of the turret. Production is doubled over the old method . . . time lag is cut to a minimum . . . there's twice the time between tool changes.

This smart setup illustrates one of the many ways Fastermatic Automatic Turret Lathes give you greater efficiency and lower costs on a broad range of jobs. And one operator can usually handle two or more machines. Ask for the facts.



Floor-to-floor time for these pulley flanges is down to 1.75 minutes. Duplicate tools and collapsing taps on the turret rough and finish the bore, chamfer and cut threads. Front and rear slides shave the angle and form the radius on the O.D.

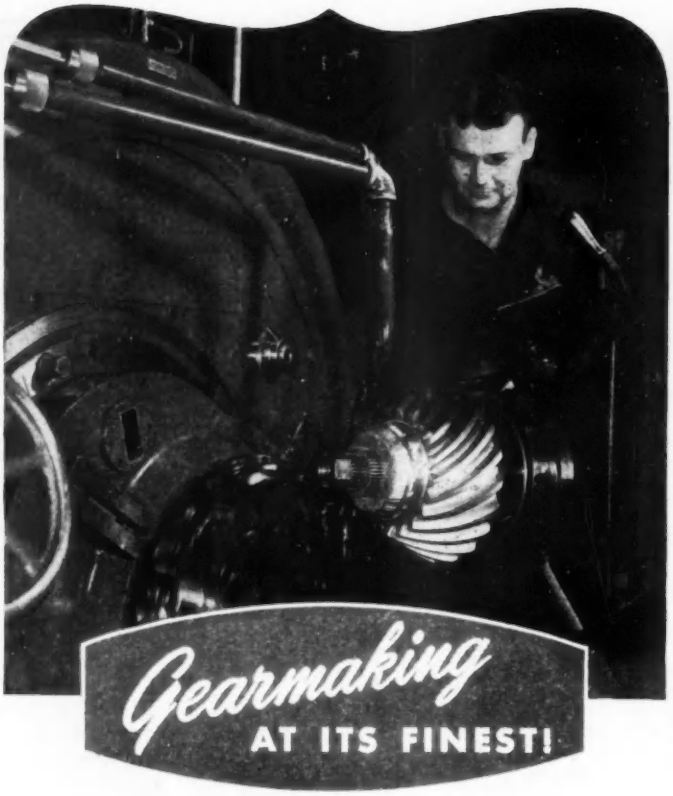


Gisholt 1F Fastermatic Automatic Turret Lathe

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



HERE "under one roof" at FAIRFIELD is *everything* needed for producing fine gears — metallurgical department, batteries of the most modern machines, testing laboratories, complete heat-treating facilities — all operated by skilled craftsmen working under expert engineering supervision. By specializing exclusively in "FINE GEARS MADE TO ORDER" for more than thirty years, FAIRFIELD has become one of America's largest producers of these parts. This is why many makers of construction machinery . . . agricultural implements . . . machine tools . . . military equipment . . . tractors, trucks, and buses now regularly depend on FAIRFIELD to meet their requirements. *For the Best in Gears, Specify Fairfield!* FAIRFIELD MANUFACTURING CO., 319 So. Earl Ave., Lafayette, Indiana.

(*Continued from page* 100)

the long run, it has been pointed out that anticipated revenue has frequently been underestimated in the past. If this should prove to be true again, it would mean a narrower gap between expenditures and receipts than is currently forecast. Moreover, experience has shown that the Government often finds it difficult to spend money as fast as it would like to. In the event that it should become necessary for the Treasury to undertake substantial new borrowing, moreover, the extent of the inflationary effect would depend upon the amounts subscribed by "non-bank" lenders.

PUBLICATIONS

(*Continued from page* 62)

H-46 Bandmachining

DoAll Co.—A 16-page brochure covering the contour-matic, a hydraulically operated bandtooled machine, is available. This brochure explains bandmachining, describes the features of the Contour-matic in detail and illustrates its use on many diverse industrial applications.

H-47 Flexible Shafting

F. W. Stewart Mfg. Corp.—Just issued is a 64-page book on flexible shafting. It shows, with graphic illustrations, many applications in a great variety of industries.

H-48 Presses

Clearing Machine Corp. — Bulletin No. 215 describes and illustrates the firm's line of open back inclinable power presses.

H-49 Wheel Former

Pratt & Whitney Div., Niles-Bement-Pond Co.—The Diaform wheel forming attachment for truing complex forms on grinding wheels is fully described.

H-50 Underdrive Presses

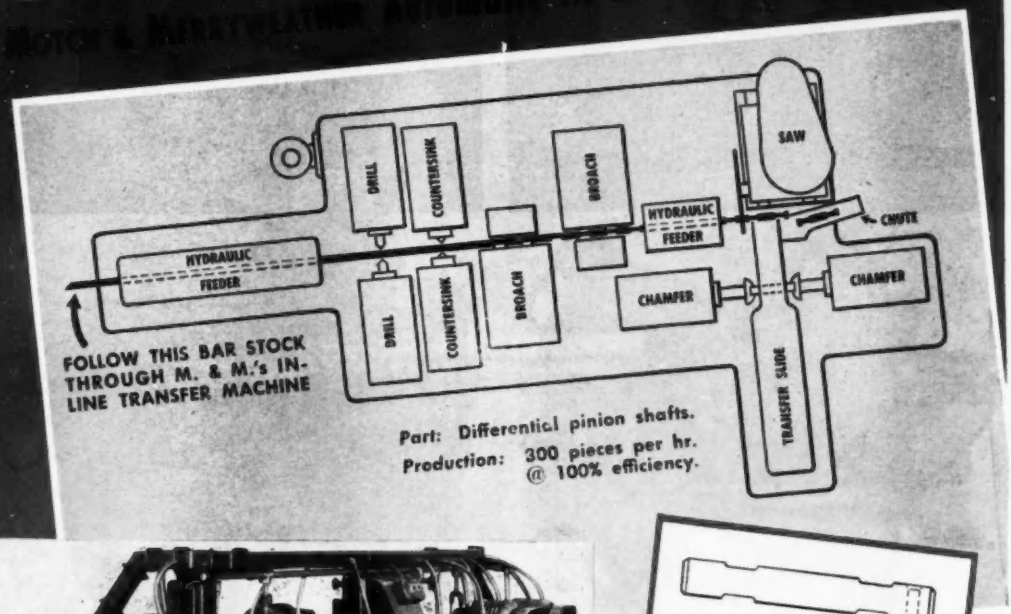
Danly Machine Specialties Inc.—Announced is the availability of a complete catalog on a line of single, double and triple action underdrive presses. Principal features of Danly Underdrive presses are completely illustrated and the catalog contains detailed specification data and explanation of operating features.

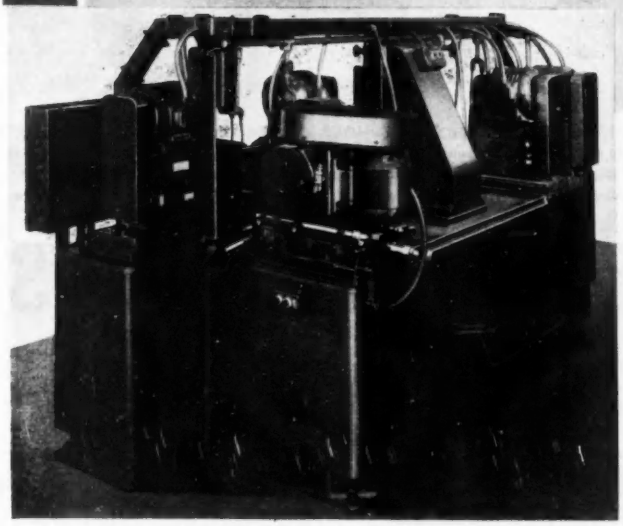
AUTOMOTIVE INDUSTRIES . . .

is your News Magazine of Automotive and Aviation

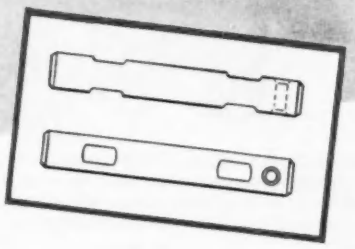
MANUFACTURING

Combine Operations





Save time and floor space by combining operations.



● Many machining operations are combined on an M. & M. progressive IN-LINE automatic transfer machine. Stock is held *motionless*. Most of the operations are performed on a length of solid bar stock prior to cutting off. Using the progressive in-line principle, we can design a production machine for your individual requirements. Odd-shaped extrusions present no machining problem.

Send us your parts drawings.

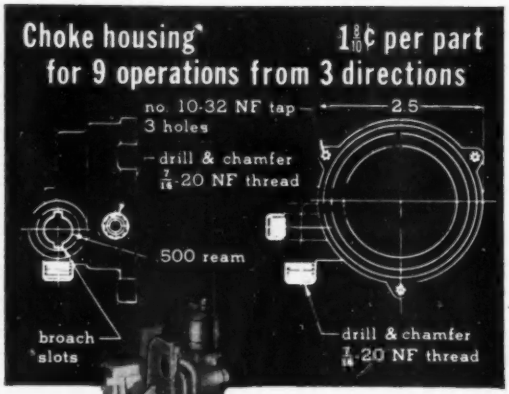
Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY

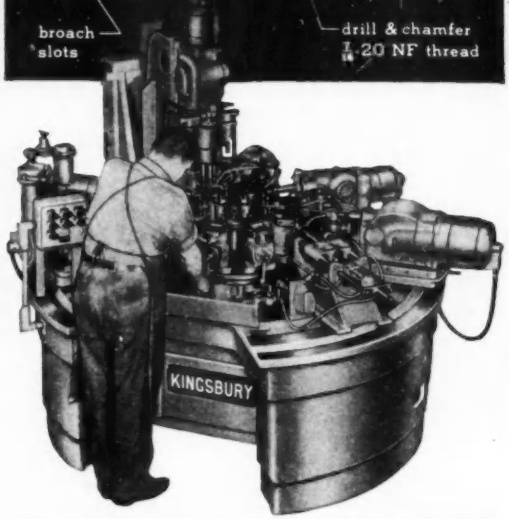
715 PENTON BUILDING • CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT



155 PARTS AN HOUR GROSS. This non-index machine has one fixture in the center that holds the shaft with its axis vertical. Four horizontal and two angular units drill all nine holes at the same time. Clamping and unclamping are automatic.



305 PARTS AN HOUR GROSS. On this 20-inch "Auto Index" horizontal units work on two faces. Two units are 45° left of radial lines through the fixtures; three units and an air cylinder for the broach are 45° right. A vertical unit taps three holes.

One Kingsbury replaces

Special-purpose high-production machines use automatic units to perform thousands of operations per man-hour

Dear Sir:

How many operations do these four Kingsburys do in an hour? If you multiply the number of operations per part by the production at 80% efficiency you get —

Shaft	1116
Choke Housing	2196
Transmission part	5856
Throttle Body	4800

Compare the number of operations that standard machines do in an hour with these Kingsbury figures. That gives you an idea how many standard machines one Kingsbury can replace.

Several machines in one

Each machine has several automatic drilling and tapping units (½ to 5 hp) that operate at the same time. Each unit does the operations that one standard machine would do.

On the machine for the Shaft all units operate on the same part at the same time. The other three machines have index tables with a number of duplicate work fixtures. The units operate at different stations. The table indexes to present each part in turn to each station.

All this in 7.4 seconds

For example, the Throttle Body machine does all this in 7.4 seconds:

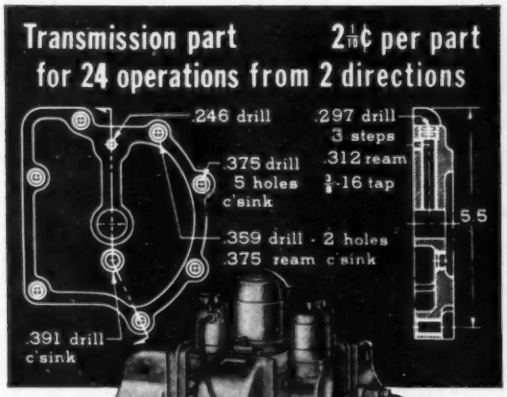
In front the part is unclamped. The man removes it and replaces it with another part. (The right view is the plan view in the fixture.)

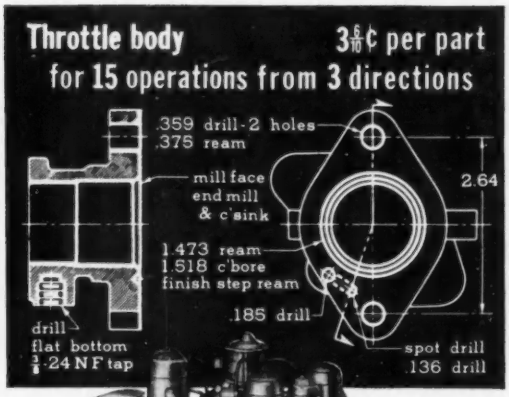
At station 1 on his left a milling unit mills the face of another part.

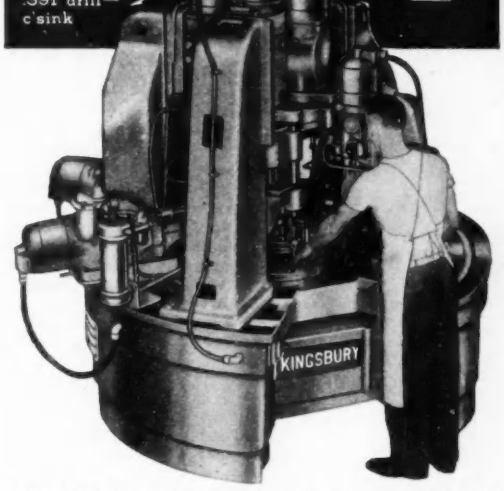
At station 2 a vertical unit counterbores another part 1.518.

At station 3 a horizontal unit drills for the tapped hole. A 4-spindle vertical unit drills three holes at station 3 and spot drills at station 4 because the center distances are so close.

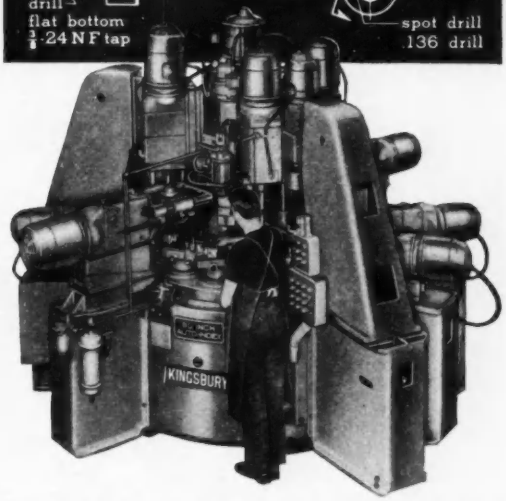
At station 6 in the rear an angular unit drills the .136 hole.







305 PARTS AN HOUR GROSS. A 20-inch power index table has eight fixtures. Three horizontal units drill .297 in steps for a short time cycle. Two others ream and tap. Four vertical units with multi-spindle heads do the nine holes in the left view.



400 PARTS AN HOUR GROSS. Here is a 60-inch automatic indexing machine, the largest size we build (and ever hope to). It has one angular and four horizontal units on knees that are bolted to the base and six vertical units on the central column.

many standard machines

At station 7 a vertical unit reams the throttle bore 1.473.

At station 9 a vertical unit finish step reams the throttle bore and a horizontal unit flats the bottom of the tapped hole.

At station 10 a 2-spindle vertical unit reams two holes .375 and a horizontal unit taps 3/8-24.

At station 11 on his right a vertical unit with a combination tool end mills the face to remove tool marks and countersinks the throttle bore.

All that takes 7.4 seconds. Indexing takes 1.6 seconds. So the total time cycle is (theoretically) 9.0 seconds. That means a gross production of 400 parts an hour (3600 secs. ÷ 9 secs.).

This machine has no units at stations 5 and 8, so our customer can add operations if the product should change. On any Kingsburys you can relocate units and change speeds and feeds. Compared to general purpose machines they are not too flexible.

But their output is just terrific.

Sincerely,

Kingsbury Machine Tool Corp.
96 Laurel Street, Keene, N. H.

Each unit cost on the drawings includes the cost of the man and of the machine - no power or overhead. We assumed:

Unit cost of the man equal to:

$$\frac{\text{average U.S. hourly wage}}{\text{hourly gross} \times 80\% \text{ efficiency}}$$

Unit cost of the machine to be:

$$\frac{\text{price of tooled machine}}{\text{output in 6000 hrs. @ 80\% eff.}}$$

KINGSBURY

AUTOMATIC DRILLING & TAPPING MACHINES
for Low-Cost High Production

THESE Fairchild Aircraft Packets carry men and materiel spelling nothing but trouble for the enemy.

But the packet of lightweight castings used on the Packet and made by Wellman won't cause any trouble.

Why?

Simply because we've learned a lot in 40 years about making quality castings; we have four complete plants; modern inspection techniques; close metallurgical control.

Like to receive the Wellman Magazine free every month? Drop us a note on your business letterhead.

Well-Cast Aluminum, Magnesium and Bronze Castings—Well-Made Wood and Metal Patterns.

THE WELLMAN BRONZE & ALUMINUM CO.

2532 EAST 93rd STREET • CLEVELAND, OHIO

Gas Turbine French Truck

(Continued from page 52)

The turbine has two power wheels of 9.84 in. diameter and a brake turbine wheel of 7.08 in. diameter. At speeds below 40 mph the two wheels are fed in series, and at higher speeds a supplementary exhaust valve is opened after the first wheel, so that only this first wheel is in operation. At 50 mph the turbine revolves at 30,000 rpm. At road speeds between 11 and 50 mph an output of better than 220 hp is maintained. With one generator in service, the output is 100 hp between 12 and 40 mph. Between the range of 100 and 240 hp on the turbine shaft, the specific fuel consumption is about 250 gm per hp-hr. Low-grade fuels are used.

Experiments have shown that successful operation is obtained with a two-speed transmission with ratios of 1 to 2, and a reverse. On a 20 per cent gradient, a speed of three mph is obtainable; on a 10 per cent gradient the speed is 16 mph, and at 50 mph on the level only 70 per cent of the maximum power is used. With one generator in service, speed on the level is limited to 40 mph, with the possibility of starting away on a 10 per cent gradient.

Gear changing presents certain difficulties, for on declutching the turbine may be running at its maximum of 30,000 rpm, and internal friction is so low that even with the gas completely cut more than a minute may elapse before it is slowed down to make the required gear change. This makes necessary a means of slowing down the turbine, and this result is obtained by fitting the turbine with a brake wheel supplied with gas on declutching. The turbine brake wheel also provides a very effective brake on long downgrades. With both generators in operation a truck having a total weight of 18 tons can be stopped on a 14 per cent gradient without use of the usual friction brakes, and on a 20 per cent gradient speed can be held to 25 mph by directing the gas to the turbine brake wheel. With one generator in operation, the truck can be held to 31 mph on a 10 per cent gradient. This makes it possible to descend all ordinary gradients without the use of the friction brakes.

Hamilton Receives Many Orders for Cockpit Cooling Units

Hamilton Standard Div. of United Aircraft Corp. has announced the receipt of substantial orders for aircraft cockpit refrigeration units. These will reportedly be installed in seven types of planes, including jet fighters and a turbo-prop transport.

Longer wear-life is another *extra* designed into every Fuller Heavy-Duty Transmission.

These gears pictured here, for example, were taken from a Fuller 5-A-920 which logged 750,000 miles . . . 30 times around the world . . . WITHOUT OVERHAUL.

That's why owner Stan Iskra, of Bellevue, Ohio, says:

"After seeing all of the mileage which I have gotten out of this transmission, I wouldn't think of buying another truck that did not have a Fuller Transmission."

This particular tractor was in service hauling steel from Pittsburgh to Detroit and nearby points, part of the time pulling a double-dolly train. But its *longer* wear-life record could have been posted in any kind of heavy-duty hauling—off-highway or on—because there is a Fuller Transmission to match every "road and load condition." More than 101 models, in fact.

Choose a Fuller Transmission or Auxiliary for your rig. You'll find, like Stan Iskra, that it pays in more tonnage hauled at the end of the year for far less, particularly in maintenance.

Unretouched photographs above show the original gears, just as they came out of Stan Iskra's 5-A-920 Fuller Transmission, after millions upon millions of punishing contacts.

Fuller TRANSMISSIONS

FULLER MANUFACTURING COMPANY (Transmission Division), **KALAMAZOO 13F, MICHIGAN**

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

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...for closer regulation

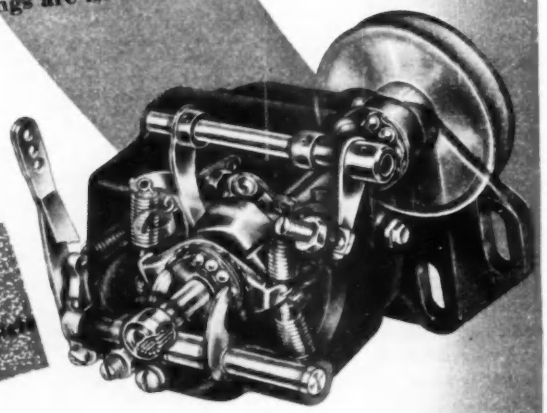
.....longer life

....less maintenance

Exclusive Hoof design gives extremely close regulation over a wide operating range *without* spring change.

Ball and roller bearings at *all* load points keep friction at a minimum and make for both long life and continued accuracy in operation.

Oil seals are used throughout and housing has large oil capacity. Daily or frequent oilings are not required.



Write for Bulletin No. 25 for complete details

HOOF PRODUCTS CO.

6543 SOUTH LARAMIE AVENUE CHICAGO 38, ILLINOIS

De Soto S-17 Custom Line

(*Continued from page* 39)

with the standard three-speed transmission; and "Tip-Toe" shift with Fluid-Torque drive—a combination of a modified M-6 transmission with a torque converter.

Improved acceleration and performance is promised with Fluid-Torque drive through the combination of the four-element torque converter which has a torque multiplication ratio of 2.34 to 1, and the modification in the M-6 transmission. Specifically, a 1.61 to 1 third speed ratio is employed, giving a breakaway torque ratio of 3.77 to 1 for a start in high range.

Incidental to the availability of the four types of drives, De Soto will provide a suitable range of rear axle ratios tailored to specific combinations. These ratios, in the new rear axle, are as follows: Standard transmission —3.73 or 3.54 to 1; standard transmission with overdrive—4.1 or 3.36; fluid coupling with M-6—3.54, 3.36, or 3.73.

Power steering, an extra cost option, is similar in design detail to the mechanism described last year (see AUTOMOTIVE INDUSTRIES, February 1, 1951), greatly reducing steering effort and facilitating parking maneuvers. For convenience, the number of steering wheel turns required for complete travel of road wheels has been reduced from 5½ to 3½ turns. Manual effort has been reduced to about one-fifth that required with conventional steering. It is of interest that this hydraulic mechanism is employed in conjunction with the conventional De Soto steering linkage. Power is supplied from a hydraulic pump mounted on an extension of the generator.

Another special equipment item, used for the first time by De Soto, is the electric type window lift mechanism. When specified, each door houses a complete, compact window lift unit, independent in operation and fully protected from water and dirt. Fast, quiet, and dependable operation of windows at all temperatures is said to be assured.

F. L. Jacobs Plants Readied to Swing to Defense Work

At a recent stockholders meeting of F. L. Jacobs Co. in Detroit, Mich., Rex C. Jacobs, president, announced that the firm's Detroit Div. plant will swing into defense production in approximately three months. This facility normally produces electric window regulators and auto spring covers. Mr. Jacobs also stated that the company's Danville, Ill., plant, where auto cushions and auto back coil spring assemblies are produced, will likewise be readied for defense production shortly.

SUN makes it easier for you

...to make equipment and training PAY OFF!

A progressive shop owner recently purchased two SUN Testers for $1,400. He sent a mechanic to the SUN Technical Training Center. Salary and expenses during training totaled about $1,000. Total investment was $2,400. During the first six weeks operation of his Diagnosis Department, he diagnosed over 200 cars at an average repair order per car of $52.45. His monthly average of service sales jumped from $6,000 to $9,257 . . . a monthly dividend of $3,257 on his original investment of $2,400.

This same story is being repeated in hundreds of dealer shops throughout the nation. The increase in service sales of SUN-Equipped Shops shows that these dealers are doing a more thorough servicing job and are building greater customer goodwill.

Over 300 SUN Representatives and 16 Technical Training Centers, conveniently located throughout the nation, are at the service of car dealers everywhere. SUN will be glad to work with dealers to aid them in establishing their own Scientific Diagnosis Departments.

Sun ELECTRIC CORPORATION 6373 AVONDALE AVENUE CHICAGO 31, ILLINOIS

B5038AI

Developments at SAE Annual Meeting

(*Continued from page* 38)

using the proper silver solder, the steel rod could subsequently be drawn to the correct temper without melting off the silver pad.

After the rod had been machined, the silver pad was made into a silver grid bearing. The silver was bored to give the correct length to the rod, and the rod was placed in a fixture fitted with a knurling roller. When the roller was passed over the silver pad, small diamond-shaped indentations were knurled into the bearing surface. Considerable effort had to be given to this knurling operation. It had been established that continuous improvement in bearing fatigue durability was obtained as the grids were made finer. Initially only coarse grids could be knurled on the silver pads, but eventually methods were developed for producing 62-½-pitch grids, giving over 3900 diamond-shaped indentations per square inch.

The indentations produced by the knurling roll were then filled with lead-tin alloy, and the bearing was diamond bored to provide a smooth surface consisting of a multiplicty of diamond-shaped areas of lead-tin possessing good embedability and frictional properties surrounded by an interconnected grid or network of silver possessing good fatigue strength and load-carrying ability. Although the lead-tin in a certain percentage of the indentations would fatigue out in service, a sufficient number would remain intact to provide the desired bearing properties.

Subsequent development of an improved method of bonding the silver pads to the slipper ends of the connecting rods resulted in an improved product and reduced production costs. The principal difficulty with the original bonding process, as described above, was that the combination of bonding and heat-treating in a single operation did not permit salvaging imperfectly bonded rods without spoiling the heat treatment. Because of the heavy investment in partially finshed rods, a large amount of effort was devoted to the problem of developing a bonding method which would overcome this difficulty. The result of these efforts was a completely successful process based on a simple soldering-iron technique.

The essential elements of the improved bonding process are illustrated in Fig. 1. The slipper end of the connecting rod was carefully cleaned, copper plated (0.00005 in.), and lightly fluxed. A sheet of 0.003-in. silver solder, the 0.50 in. silver pad (lightly fluxed), and a heat-conducting die were then applied to the rod in the manner shown in Fig. 1, the edges being sealed with

(*Turn to page* 114, *please*)

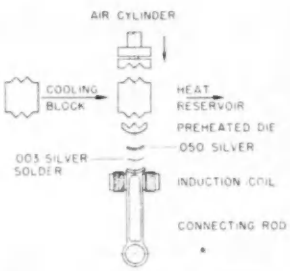


Fig. 1—Relation of parts in the improved method of bonding silver pad to slipper-type connecting rod.

Proved IN MANY SERVICES

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SPECIAL APPLICATION FRACTIONAL HORSEPOWER MOTORS

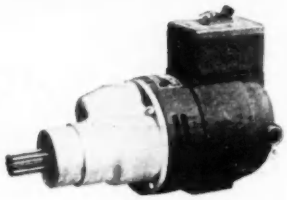
• Typical of the fields in which Lamb Electric Motors have gained a reputation for outstanding performance, are aircraft components, business machines, industrial and commercial equipment, household appliances, machine tools and portable electric tools.

Back of the good performance of Lamb Electric Motors is the fact that each motor is designed for a particular product or device, thereby insuring exact mechanical and electrical requirements.

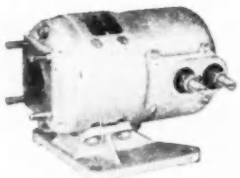
In addition to providing dependability, this *special engineering* usually results in savings in space, weight and cost factor.

The Lamb Electric Company
Kent, Ohio

THEY'RE POWERING
AMERICA'S *Finest* PRODUCTS



Geared head motor with reversing switch, adaptable to many heavy-duty, slow-speed applications.



Motor with high horsepower to low weight factor for either direct drive or use with external gear reduction.

Lamb Electric

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complete seating assembly . . .

Car manufacturers' experienced trim engineers know they can't beat coil springs for greatest riding comfort. Now, with "Acoustacoil" they can't beat coils for low cost! Here, for the first time, the coil spring seat and back constructions are combined with frames in one complete assembly, ready for car manufacturers to upholster and install on the assembly line at least possible cost.

You, too, can save two ways: . . . (1) You pay less for these complete L. A. Young manufactured assemblies than the total cost of frames and spring units from separate sources . . . (2) Due to advanced design features, you can also upholster and install them at less cost.

If you want superior comfort at actually less total cost, then specify L. A. Young "Acoustacoil" without delay!

the ULTIMATE in LUXURY *at Lower Cost*

- ★ **Being installed as original equipment in cars of leading make.**
- ★ **Hailed by car manufacturers as the last word in luxury at minimum cost.**
- ★ **Amazingly simplified design that saves greatly on critical materials.**
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- ★ **Introduces new type of foundation support for the coils, and new assembly method.**
- ★ **Provides far more toe room under backs for rear seat passengers.**
- ★ **Easier to upholster and install in cars in production. Lighter weight, yet stronger.**
- ★ **New over-all flock finish soundproofs, stabilizes, and prevents rust.**

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The performance of Niagara Knives is the result of long experience in manufacturing not only knives but the shears upon which they are used. Niagara Knives are made in the Niagara Plant with every step including design, metallurgical specifications, heat treating, grinding and inspection under Niagara control. They are made in single and four cutting edge solid steel, laid steel and high speed types. Alloys and heat treat characteristics to suit every shearing need.

NIAGARA FACTORY REGRINDING SERVICE

Take advantage of Niagara factory regrinding service by the same skilled men and on the same precision machines used in making Niagara Knives.

Each Niagara Knife is reground in accordance with its own metallurgical and heat treat characteristics as recorded by serial number at the factory.

Prolong the life of your knives by having them reground by Niagara factory methods rather than by improvised methods.

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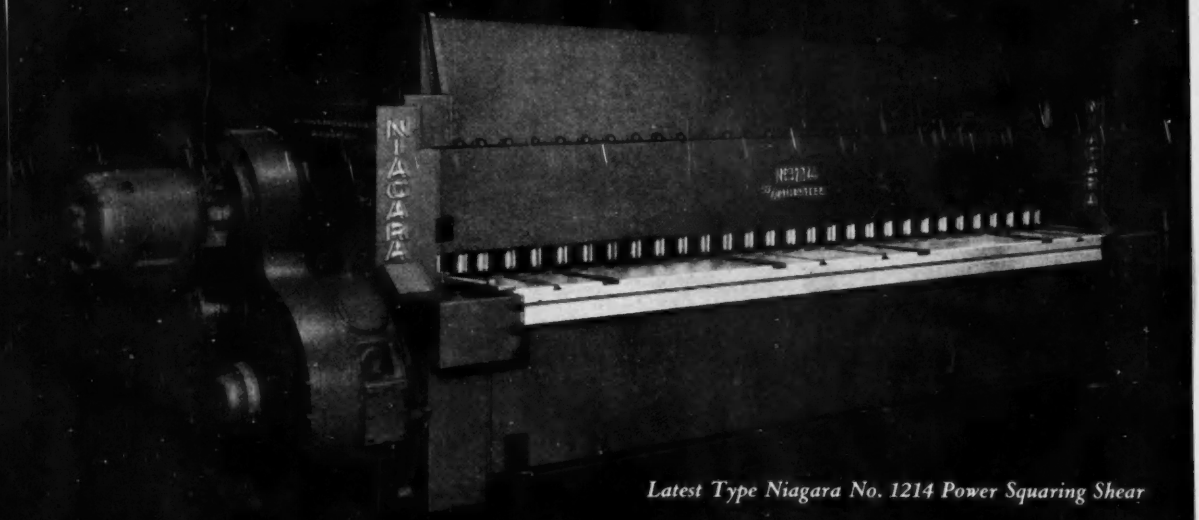
MADE BY THE MANUFACTURERS *of* POWER SQUARING SHEARS

Manufacturers of America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work



Latest Type Niagara No. 1214 Power Squaring Shear

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FORGINGS BY KROPP

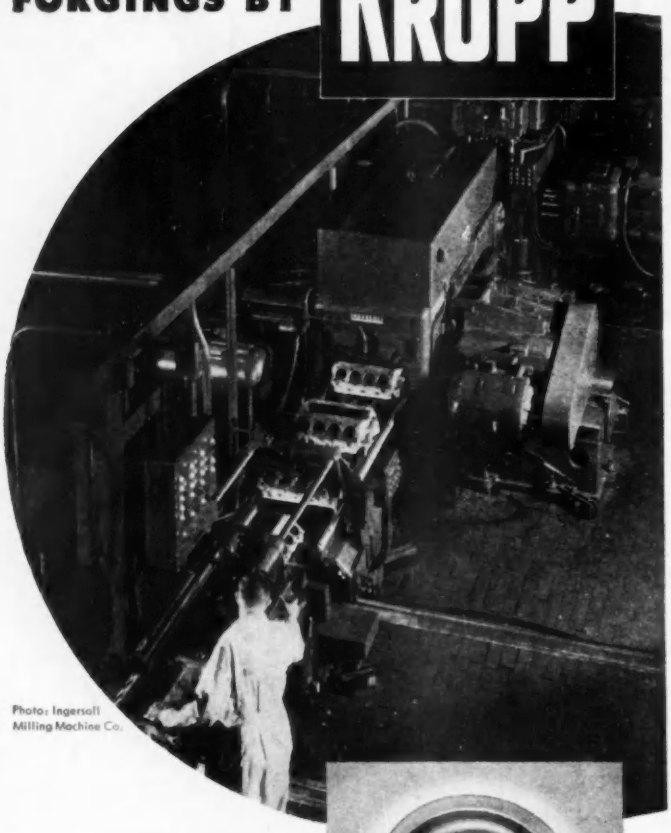


Photo: Ingersoll Milling Machine Co.

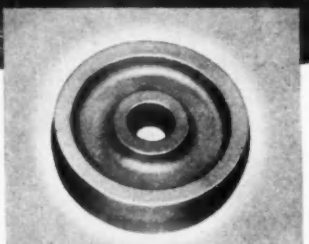
THIS FORGING HELPS MACHINE 1½ CYLINDER BLOCKS EVERY MINUTE!

90 automotive cylinder blocks machined every hour! And the Kropp forging pictured here helps maintain this pace against the steady demand for new cars.

Forgings are dependable. That's why industry uses them widely in machines and equipment.

For forged parts offering longer life, lower maintenance cost, greater safety, reduced weight and space—call Kropp—America's leading forging plant.

WHERE *Better* FORGINGS ARE MADE



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KROPP FORGE ORDNANCE CO.
MELVINDALE, MICH.

SAE Meeting

(*Continued from page* 110)

paste flux to prevent edge oxidation. These elements were pressed together at a pressure of 1000 psi by a hot block maintained at 1500 F. Conduction of heat away from the slipper end of the connecting rod was counteracted by induction heating of the rod column while the hot die was in place. When the silver solder had melted, the hot block was removed and a cold block put in its place. This cold block quickly reduced the temperature of the solder below its freezing point (1165 F). The processes of heating and cooling by means of hot and cold masses of metal were accomplished so rapidly that there was no change in the hardness or dimensions of the rod. Soundness of the bond was checked by means of the Sonigage, an ultrasonic gaging device which was developed for this purpose. The complete bonding operation was carried out in less than ten minutes per rod.

Moraine-400 Engine Bearings

By Arthur R. Shaw
Moraine Products Div, General Motors

THE Moraine-400 bearing is comprised of a steel backing to which is clad approximately .010 in. of a cadmium-silicon-aluminum alloy, GM-3889-M. This in turn is overlaid with a tin-copper high-lead babbitt by electro-co-deposition to a thickness of up to .001 in. The present Moraine-400 material is the result of eight years of development and dynamometer testing, and three years of field testing.

It has evolved as a bearing which has very promising potentialities, offering from six to ten times the bearing life of the conventional babbitt-bearing material. In one of the engines used on our dynamometer test, two sets of babbitt bearings are required in the life of one engine, while Moraine-400 bearings will outlast three to four crankshafts and blocks. Heretofore, transplanting bearings from one engine to another usually resulted in early failure, particularly in the case of high duty bearing materials. That this is possible with Moraine-400 serves to illustrate the general adaptability and conformability of this bearing. In a new General Motors Corp. medium duty truck engine, babbitt bearings would run about 100 hours of endurance testing, while the Moraine-400 bearing will run 750 hours with ease. The durability and long life of this material results from a combination of individual properties such as anti-scoring, fatigue resistance, bond, embedability, conformability, cor-

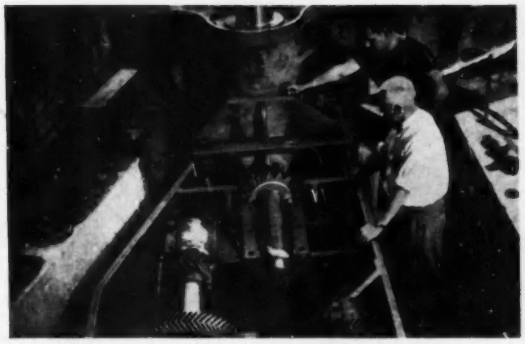
(*Turn to page* 116, *please*)

$400,000 VERTICAL BORING MILL, one of the world's largest, bores, turns and faces hydraulic turbine parts. Sunoco Way Lubricant, approved by 39 machine tool builders, was selected by the design engineers to prevent stick-slip with resultant scoring of ways and slides. Even under the weight of work as heavy as 75 tons, Sunoco Way Lubricant has never squeezed out.

TURBINE PARTS 62 FEET IN DIAMETER MACHINED BY HUGE VERTICAL BORING MILL

This mill was installed eight months ago by S. Morgan Smith, well-known hydraulic turbine manufacturer. Without alterations, it can take work up to 22 feet high with a maximum swing of 42 feet between housings. By removing the housings and adding a head to the face plate, it can be modified to handle parts 62 feet in diameter. Sunoco Way Lubricant, specified for the ways and rails by the design engineers, has been used exclusively. The mill accommodates work that weighs as much as 75 tons. No jump or stick-slip has ever marred a finish or impaired accuracy. The ways and rails remain like new. This is typical of the performance that has won the endorsement of 39 machine tool builders for Sunoco Way Lubricant. For an informative booklet and sample, write on your business letterhead to Sun Oil Company, Department AI-2, Phila. 3, Pa.

ELECTRONICALLY CONTROLLED CUTTING TOOLS machine a turbine discharge ring 9' high, 27' 8" dia., 21' 8" bore. Sunoco Way Lubricant keeps rails free of rust and corrosion. Starting up after week-end shutdowns, tables and other parts move freely on the ways and slides without jump or stick-slip.



THE SYNCHRONOUS GEAR DRIVE, controlling table speeds from .094 to 6.045 rpm., is pressure-fed with another Sun "Job Proved" product—Sunep. This extreme pressure lubricant is exceptionally stable, minimizes wear, gives long-time protection to very heavily loaded teeth in many types of gear boxes.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

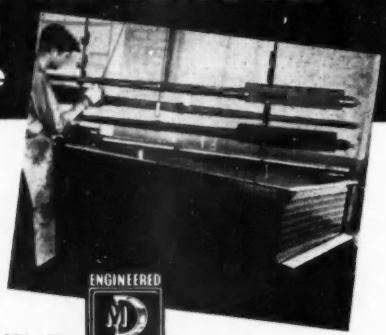
Developments at SAE Meeting

(*Continued from page* 114)

rosion resistance, and load carrying ability. To date, we have had no failures in engines which can be attributed to fatiguing or bond failures. We have had no failures from scoring where the bearings have been properly designed and installed. The embedability of Moraine-400 is, our opinion, phenomenal, being even better than our Durex-100. The conformability is excellent, being comparable to that of Durex-100. Corrosion resistance is not a problem, since the babbitt used is highly resistant to corrosion, and the resistance of aluminum to corrosive attack is well known. The load carrying ability is from four to six times greater than that of the types of babbitt bearings currently used.

In attempting to determine the load carrying ability of this material, several tests were conducted on the Olds V-8 engine. The rod bearing in this engine was chosen because there is no oil hole at the crown of the bearing to disrupt the oil film. In these tests, the bearing length was reduced to ⅝ in. by counterboring the ends giving an L/D ratio of 1 to 4. These bearings were in excellent condition after running 100 hours at 4300 rpm full throttle, which is considered a life test for the production bearings having a length of ⅞ in.

PHILLIPS degreasers used by Air Force for removing Cosmoline



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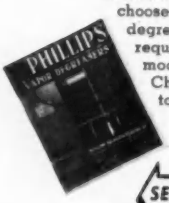
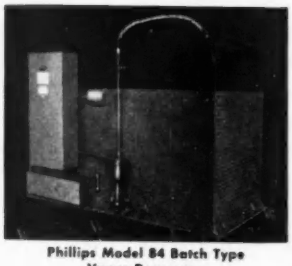
ENGINEERED SERVICE

Phillips Degreaser completely removes Cosmoline from four 20mm. guns in less than 4 minutes per gun.

BACK in the early days of World War II the government saw how important high speed removal of Cosmoline was to the war effort. The U. S. Air Forces' use of Phillips degreasers for handling one of the toughest metal cleaning jobs is proof that Phillips degreasers can and will help you increase production by solving your metal cleaning problems efficiently and economically. Out of the complete line you can choose a standard Phillips degreaser to meet most requirements. Special models built to order. Check with Phillips today!





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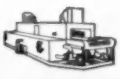
"TORRENT" WASHERS

High Lead Copper-Lead Bearings for Slow-Speed Diesel Engines

By Albert Willi, Jr.
Assistant Chief Engineer
Federal-Mogul Corp.

FOR many years, stationary and marine Diesel engines have been equipped with bronze, cast iron or steel backed babbitt-lined bearings. In the search for something better, copper-lead bearings were a natural choice. Considerable metallurgical, manufacturing and performance experience had been gained in the past 10 or 15 years that such bearings were in general use.

The copper-lead bearing most popular today in high speed, heavy duty engines contains lead in the range of 20 to 30 per cent with the balance copper. To obtain optimum performance, the shafts are necessarily induction hardened or nitrided. To further improve the compatibility between bearing and shaft, the copper-lead bearing surface is coated with a precision electro-deposition of a lead-tin alloy, usually .001 in. in thickness.

Copper and lead are insoluble in each other and their melting points differ by 1360F. These conditions make it extremely difficult to cast a copper-lead mixture and obtain uniformly good dispersion of the lead in the copper matrix when the lead content exceeds 30 per cent.

Experimental tests indicated a 40 per cent lead content suitable for use on unhardened shafts having a Brinell range of 180 to 200. This fact opened a field of application in large, slow speed Diesel or gas engines which, for economic reasons, are built with unhardened crankshafts. Improvements in the established casting technique were finally made which permitted the volume production of the high lead copper-lead bearing of uniformly good quality.

At the present time, the most successful bearing is described as a low carbon steel backed type lined with a 60 per cent copper, 40 per cent lead mixture. The copper-lead bearing surface is overplated with a lead-tin alloy, containing 8 to 12 per cent tin, balance lead, to a thickness of .001 in. to .002 in.

(*Turn to page* 118, *please*)

Mighty muscles to wrestle kegs

but not for steering

Horse Power Did The Steering Then . . . *Why not now!*

Majestic brewery horses, as they nodded their gay plumes and jingled the shining brass-mounted harness, supplied horsepower for steering. The driver merely guided them with easy wrist motions. He had mighty muscles—for wrestling kegs—not for fighting a steering wheel. • The ordinary brewery truck or other truck of today has lost its horsepower for steering. Everything is made easy for the driver except the job he has to do at every corner he turns . . . when dodging traffic . . . in parking. He herds the hack by main strength, often parks with wrenching heaves. If the vehicle is very big he has to have mighty muscles, no matter what he's carrying. • And he tires on the job . . . he slows down, becomes less efficient and gets less done. • Why not have Vickers Hydraulic Power Steering on your trucks? It provides the horsepower for steering so the driver can handle any vehicle with an easy twist of the wrist. He retains his efficiency and gets more done . . . with greater safety. Get the details on Vickers Hydraulic Power Steering; write for Bulletin M-5100.

4697

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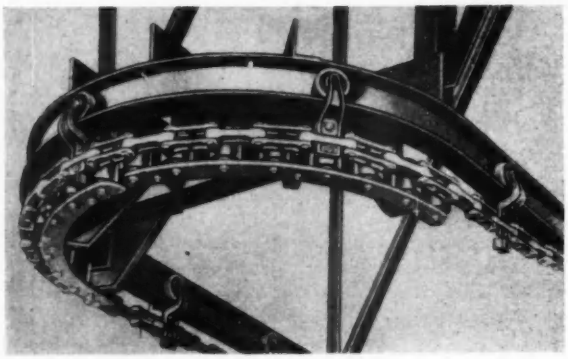
VICKERS hydraulic
POWER STEERING
is Effortless, Positive and Shockless

The FIRST Roller Coaster

Originally known as the Switchback, the first Roller Coaster was built in Paris in 1816. The crude originals were soon discontinued because of numerous fatalities. However, in 1880 they were again introduced in Paris and the United States simultaneously —and have since been enjoyed by millions.

JERVIS B. WEBB COMPANY was the FIRST to develop Horizontal Roller Curve Assemblies



Typical Webb Horizontal Roller Curve Assembly

The Webb Roller Curve is the most economical, serviceable and satisfactory unit for carrying an overhead conveyor chain around a horizontal curve. Chain and trolleys are held in the correct vertical position by ball bearing rollers which reduce both friction and wear to a minimum. Roller Curves are made in various radii and arcs for varying needs. Rollers are mounted between two segment bars.

The Working Part Of A Roller Curve Is The Roller

Rollers used in Webb Roller Curves are specially designed and built for the service. Available for two types of lubrication . . . oil hole in cover and grease fitting in drilled center pin. In either case, the Roller Curve is assembled so as to make lubrication easy. The design of the Roller Curve is such that the rollers are readily replaceable without dismantling.

CONVEYOR ENGINEERS AND MANUFACTURERS

JERVIS B. WEBB COMPANY

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FACTORIES IN DETROIT . . . LOS ANGELES . . . HAMILTON, ONT.

SAE Meeting

(*Continued from page* 116)

The Application of Ball Joints to Front Suspensions

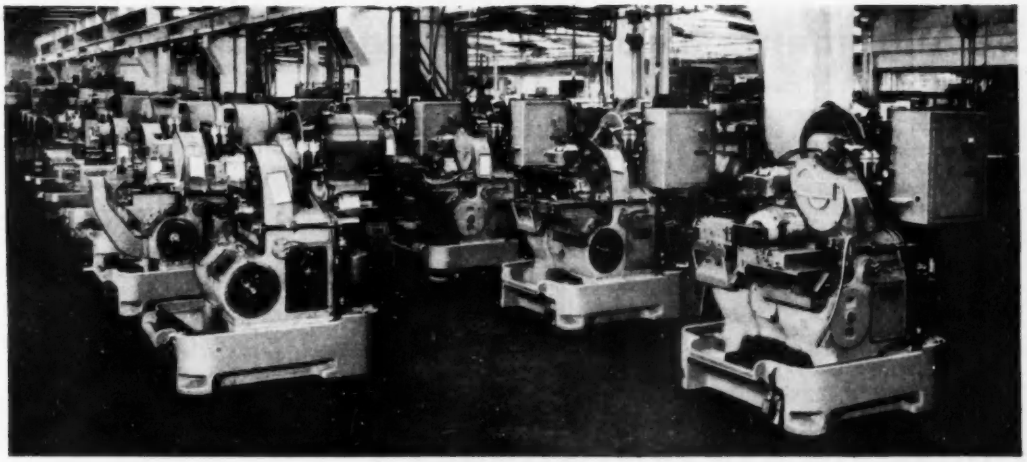
By James H. Booth
Michigan Plant
Thompson Products, Inc.

THERE is nothing new in the idea of applying ball joints to a front suspension. The Thompson Products, Inc., design (see application on 1952 Lincoln, AUTOMOTIVE INDUSTRIES, January 15 issue, page 34—Ed.) is novel, however, in that the steering motion in the lower joint has been transferred from a spherical load-carrying surface to a ring of balls for the purpose of reducing the turning resistance. Along with this modification, a damping force has been provided by placing a spring loaded clutch in the upper ball joint, where a small portion of the car weight and braking forces are concentrated. The magnitude of the control can be determined experimentally by evaluating changes in car handling that result from varying the load on the clutch surfaces.

The advantages that can be credited to the ball joint front suspension application are:

1. Suspension action and steering motion are combined at one point into a neat package.
2. Damping control is provided at the wheel in the steering motion.
3. A free turning action is provided in the load-carrying lower socket.
4. Front suspension bind, due to assembly line misalignment or improper service installation, is eliminated by ball joints.
5. Engine compartment space can be increased by moving the inner pivots outward an amount equal to the distance between the original outer pivot points and the kingpin line. This can be done because the ball joints are located on the kingpin line. Since the majority of American car manufacturers are moving toward shorter and wider engines, the need for more space between the frame side rails is desirable.
6. Greater wheel travel can be obtained instead of more engine compartment space if the inner pivots are not moved and the arms are extended to the kingpin line.
7. A compact service package is created in the ball joint which can be removed easily from the suspension. The equivalent of a complete rebushing operation at the outer ends of the arms can be accomplished within one-half hour. In addition to eliminating reaming and fitting of the kingpin, disassembly of the brakes, and complete bleeding of the brake system, the necessity for realignment of the wheels is avoided

(*Turn to page* 120, *please*)



Five times former production!

That's what happens when Chuck-Matics replace hand machine methods for this High-Precision job

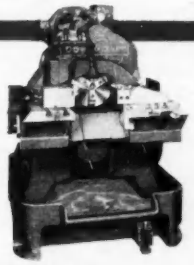
HERE'S THE STORY . . .

Most of the machines in this battery of Chuck-Matics were bought by one manufacturer, to do primary operation jobs—*and do them fast.* And, like many other jobs—such as bearing races, gear blanks and similar short-length parts—this customer's parts are rolling out in record time. The Chuck-Matic literally runs rings around ordinary hand-machine methods. Production increases of two to six times are the usual, rather than exceptional experience.

AND HERE'S THE JOB

PART	— Cast-iron Cap
SIZE	— 6⅝" Diameter
OPERATIONS	— 5
TOOLS	— Carbide-tipped
MACHINE TIME	— 35 Seconds
PRODUCTION	— Five Times Former (Hand Machine) Method

—AND HERE'S THE MACHINE—



The 12" ACME-GRIDLEY Chuck-Matic Single-Spindle Chucking Machine

- Removes metal as fast as carbide tools can take it.
- Versatile in operation; accommodates special machining requirements such as taper boring, internal recessing, relief facing and many other primary operations.
- Easy to set up, accessible for quick changes from job to job.
- Easy to operate; one operator can run as many machines as cycle time of jobs permit.
- Spacesaving; floor dimensions: 45" wide, 64" long.
- Rugged! Powerful! Meets high-precision standards on castings, forgings and tubing parts.

Ask for Bulletin SC-46

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Developments at SAE Meeting

(*Continued from page* 118)

because any wear occurring on a ball joint suspension in the direction of the kingpin line.

8. The durability of the surfaces in the ball joint has indicated much improvement over the pins and bushings which they replace.

9. Brake anchor pins can be attached directly to the spindle support because they now turn together as an assembly. The backing plate is reduced to a dust cover, since it no longer carries brake load. This transfer of the braking forces directly from the anchor pin to the spindle support reduces one cause of vibration and noise.

10. Reductions in unsprung weight are possible by the use of ball joints.

11. The omission of several parts and the costly machining operations required to produce them is a direct advantage.

12. Lubrication points at the outer end of the suspension are reduced from approximately five to two fittings per side.

CONTROL POWER BETTER

STOP and GO
ENGINEERING
ROCKFORD engineered clutch applications are serving successfully in machines that vary from tiny, precision instruments to the largest, heavy-duty tractors. This diversity has built up a breadth of experience that is of timely value to product designers. Call in a ROCKFORD clutch engineer, the next time you are up against a power transmission problem, and benefit from over a quarter century of experience in making thousands of clutch, power take-off and speed reducer applications.
BW

ROCKFORD CLUTCH DIVISION
BORG-WARNER
315 Catherine Street, Rockford, Illinois

ROCKFORD CLUTCHES

Factors Affecting Diesel Lubricant Performance

By H. C. Morris
The Texas Co.

ALTHOUGH the specific design features of any engine determine its performance characteristics, it is believed that on the basis of the experimental work, the following generalizations may be drawn which are applicable to the general class of Diesel engines.

1. When using a given fuel there is strong evidence to suggest that a definite relationship exists between exhaust smoke, used oil condition, piston temperature and piston deposits such that (a) in the "no-smoke" region piston deposits are primarily controlled by lubricant deterioration and increase with increasing piston temperature or fuel-air ratio; (b) in the smoke region piston temperature is relatively constant and deposits are primarily governed by the amount of incomplete fuel combustion products which increase with increasing fuel-air ratio or throtttle opening. It is very evident that improper maintenance or maladjustment can shift engine operation from the "no-smoke" to the smoke region and thus greatly accelerate the rate of deposit formation.

2. The various hydrocarbon types existing in diesel fuel appear to exert some influence on deposit formation although in this work it has not been possible to establish the specific relationships involved. However, the effect of excessive exhaust smoke on the rate of deposit formation is so pronounced that, under very rich mixture conditions, it would tend to overshadow the effect attributable to the hydrocarbon types present in the fuel.

3. Sulfur compounds present in the fuel have an accelerating effect upon deposit formation.

4. Additive oils containing detergents and anti-oxidants are effective in reducing deposits steeming both from the sulfur present in the fuel and from soot due to incomplete combustion.

Surface Finish—Its Effect on Wear

By C. R. Lewis
Staff Research Engineer
Chrysler Corp.

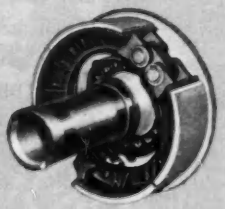
IF a new piece of machinery is made with initially very smooth surfaces with the expectation of reducing wear, the designer may be seriously

(*Turn to page* 124, *please*)

TDA BRAKES

for any job—anywhere—any time

No matter what your braking problem, there is a TDA Brake to do the job. When you equip your product—whether it is an industrial machine or a heavy-duty vehicle—with TDA Brakes, you are guaranteeing your customer safe, sure, dependable braking at bedrock maintenance cost. That's why TDA Brakes are demanded by users of heavy machinery everywhere today—so widely demanded that there are more TDA Brakes in actual operation on heavy-duty commercial vehicles than any other make. This universal acceptance has been honestly earned. For more than 40 years, TDA's engineers have been designing and building brakes to do a superior job for the automotive industry. This experience is your assurance of outstanding performance, whenever you install TDA Brakes.



This air-actuated P Series power brake is ideal for the road-building equipment shown above and for all heavy-duty equipment. It is extremely versatile in itself but is just one of the many great TDA Brakes designed to solve your braking problems, no matter what type of machine or vehicle is involved.

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TDA BRAKE DIVISION

THE TIMKEN-DETROIT AXLE COMPANY
ASHTABULA, OHIO

The Accepted TDA Standard

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WHATEVER YOUR BRAKING PROBLEM—TAKE IT TO TDA!

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Please mail brake information on these applications:

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COMPANY _____

ADDRESS _____

CITY _____ STATE _____

Friction material problem?

R/M BELONGS IN YOUR PICTURE!

"STOP-AND-GO" IS OUR BUSINESS!

Maybe you don't make tractors or combines or other types of farm equipment... but *whatever* your problems in brakes and clutches, you can count on RAYBESTOS-MANHATTAN for specialized friction materials that will do for you what R/M products do for farm machinery manufacturers.

R/M leadership in friction materials is well recognized in dozens of industries. Take the automotive industry, for example: more cars, trucks and buses use R/M brake linings, clutch facings, and automatic transmission friction parts than any other make. Other examples of R/M leadership in friction materials are found in the construction equipment, oil drilling, and mine machinery fields.

Your R/M representative is ready to help you now. He can work from samples, from designs on paper, or from figures on horsepower developed; combined with desired performance characteristics. Behind him stand the full facilities of the world's largest maker of friction materials... with six great plants, their research departments, and their testing laboratories.

The recent opening of our new Wabash Division, Crawfordsville, Ind., provides expanded facilities for the manufacture of
SINTERED METAL FRICTION MATERIALS

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FIRST IN FRICTION

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EQUIPMENT SALES DIVISION **620 Fisher Bldg., Detroit 2, Mich.**

Chicago 11 **Cleveland 14** **Los Angeles 11**

Factories: **Bridgeport, Conn.** **Manheim, Pa.** **Passaic, N.J.** **No. Charleston, S.C.**
Crawfordsville, Ind. **Canadian Raybestos Co. Ltd., Peterborough, Ont.**

RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings Fan Belts • Radiator Hose • Mechanical Rubber Products • Rubber Covered Equipment • Packings Asbestos Textiles • Sintered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

R/M

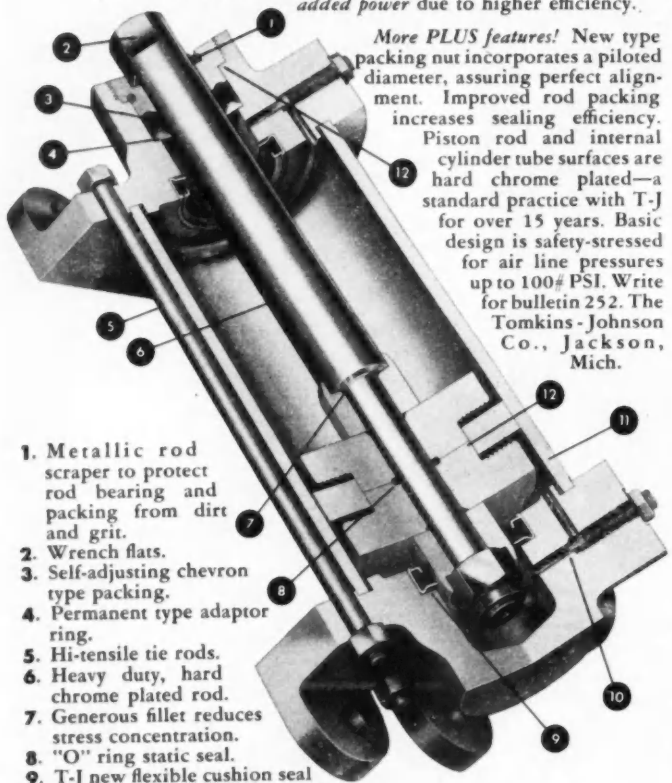
New Flexible Sealing...

T-J AIR CYLINDER

Designed with revolutionary application of

Super-Cushion

It's *sealed with pressure*—a revolutionary T-J application of flexible sealing that insures positive cushion action combined with automatic valving action for fast return stroke . . . eliminates binding and sticking . . . operates with *low friction, minimum wear,* and *added power* due to higher efficiency.



More PLUS features! New type packing nut incorporates a piloted diameter, assuring perfect alignment. Improved rod packing increases sealing efficiency. Piston rod and internal cylinder tube surfaces are hard chrome plated—a standard practice with T-J for over 15 years. Basic design is safety-stressed for air line pressures up to 100# PSI. Write for bulletin 252. The Tomkins-Johnson Co., Jackson, Mich.

1. Metallic rod scraper to protect rod bearing and packing from dirt and grit.
2. Wrench flats.
3. Self-adjusting chevron type packing.
4. Permanent type adaptor ring.
5. Hi-tensile tie rods.
6. Heavy duty, hard chrome plated rod.
7. Generous fillet reduces stress concentration.
8. "O" ring static seal.
9. T-J new flexible cushion seal insures positive cushion with automatic valve action for fast return stroke. (Patent applied for)
10. Fine cushion adjustment.
11. Heavy wall precision honed hard chrome plate.
12. Controlled packing compression with metal to metal contact.

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36 YEARS' EXPERIENCE T-J

TOMKINS-JOHNSON

RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

SAE Meeting

(*Continued from page* 120)

disappointed. It is true that under ideal laboratory conditions, smooth surfaces wear more slowly than rougher ones. However, in practical machinery, manufacturing tolerances appear that were not in the original design, assembly deflections occur which were not allowed for, and thermal distortions appear far more often in operating machines than on drafting tables.

As a result of the accumulation of these small factors, the fits of wearing surfaces are seldom those envisaged by the designer, or those best suited to the operation of the part. Under these circumstances, best results are obtained by allowing some initial roughness on wearing surfaces.

If a surface is made too smooth initially, the small actual contact area which carries the load will grow larger only slowly, due to the low wear rate of the smooth surface. Even after prolonged running, sufficient wear may not occur to compensate for the irregularities discussed above. On a smooth surface, the asperites usually have very gradual slopes, so that plastic deformation is reduced due to the support at the sides of the asperites. With gradual slopes, actual contact area increases rapidly as wear progresses. Both of these factors contribute to a low initial wear with smooth surfaces.

On such surfaces, running-in requires an excessive time, and scoring and seizure may occur due to insufficient run-in, even after prolonged periods of operation.

On a somewhat rougher surface, the highly loaded contact points will wear so as to distribute the load more uniformly and provide mutually compatible mating surfaces after a short run-in period. If the initial surface is too rough, the wear rate is high, but the run-in period is longer, in order to remove the surface asperities, and there is danger of destructive wear with no suitable run-in.

The optimum roughness for a given surface must be a matter of either experiment or experience, but in general, as design and manufacturing practice for a given surface is improved, it is feasible to decrease the surface roughness and to realize the inherently lower wear of smooth surfaces.

Effect of Chemistry and Section Size on Ductile Iron

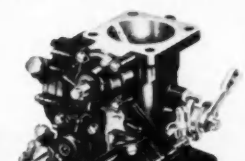
By D. J. Reese, International Nickel Co.; F. B. Rote, Albion Malleable Iron Co.; G. A. Conger, University of Michigan

Maximum strengths can be secured in as-cast ductile iron by proper balancing of chemical composition and section thickness. In general the com-

(*Turn to page* 130, *please*)

STROMBERG

SELECTED FOR Le Sabre



Stromberg Carburetor
PS-5C used on Le Sabre

An experiment in the automotive future—a low sleek sports car with dramatic, sweeping lines of a jet aircraft is how General Motors describes its new car, the Le Sabre.

Every advanced engineering and styling feature was planned with the thought of finding out if the futuristic ideas of today might prove to be the accepted standard of tomorrow's conventional motor car.

For example, although Le Sabre carburetion presents an entirely new problem due to the use of methyl alcohol, together with current premium fuel, the carburetor itself is a specially designed Stromberg—the quality carburetor on today's conventional motor car.*

For any car manufacturer planning for future requirements or meeting today's need for finer, more dependable carburetion—Stromberg is the answer.

*REG. U.S. PAT. OFF.

ECLIPSE MACHINE DIVISION OF
ELMIRA, NEW YORK

Bendix
AVIATION CORPORATION

300 Ton-Miles per Gallon with Two-Stroke Diesel

(*Continued from page* 45)

duplicated the fuel consumption figures measured before the 100-hour run.

In the last 16 hours of the continuous run six minutes full load was alternated with four minutes idling at 500 rpm (Fig. 10 right end). The engine took the full load always willingly.

During the first 80 hours the lubricating oil consumption was 0.8 litre/hr which corresponds to 0.011 lb/bhp-hr.

After the 100-hour run the engine was stopped and disassembled. All components, bearings, cylinders, and pistons showed unblemished running surfaces. Only on one piston was the top piston ring slightly sticky, all the rest were so loose that they fell by their own weight. The injectors were in good shape, no craters or heavy deposits. The six orifices were open and gave a symmetrical spray and good chatter in the nozzle test stand.

A feature of the Krauss-Maffei engine is the ease of its disassembly. Individual cylinders can be dismantled in about an hour and the pistons can be pulled without removing the oil pan. All accessories are easily accessible. This makes servicing easy and convenient.

The laboratory tests were followed by road tests on superhighways (autobahns) and secondary roads. The vehicle had a certified total weight of 29,210 lb. The travelled stretch totalled 1060 miles which was covered without encountering any trouble. Grades of 18 per cent and at one spot even 22 per cent were negotiated. The exhaust was barely visible and completely satisfactory.

The primary object of the road test was to prove the reliability of the engine, which it has done to perfect satisfaction. Another object was to measure the fuel and lubricating oil consumptions under road conditions and also the accelerations.

Economy runs were travelled in both directions and the averages computed. Speeds were determined by clocking the time of the kilometer stones which are placed on the autobahn every 500 meters. The fuel consumption was determined by the decrease of the fuel level in a measuring burette. The following values resulted:

Speed	Fuel Mileage	
miles/hr	miles/gallon	ton-miles/gallon
12.81	19.55	286
21.18	19.88	291
32.01	16.08	235
41.80	13.11	192
53.01	10.77	157

In Fig. 12 the measured values are marked by crosses. If the axles and tires had permitted heavier loading 300-ton-miles per gallon would have surely been achieved. Over a distance of 716 miles the lubricating oil consumption was 527 miles per gallon.

Of the extensive test program the acceleration test may finally be mentioned. For these tests a level stretch was selected and run in both directions. Starting from still stand and shifting gears, the vehicle accelerated in 60 seconds from zero to 43.5 mph. Using only the 6th (high) gear it took 54.4 seconds to accelerate from 18.6 mph to 43.5 mph (Figs. 13 and 14).

The Krauss-Maffei KMD6 engine was investigated by the authors in a thorough manner for almost three weeks on the test stand and on the road. They can certify that it combines the simplest construction with high economy and great reliability. The engine represents a significant step in the development of the automotive Diesel engine.

TUNG-SOL
AUTO LAMPS ®
Engineered to make America's Cars the World's best lighted
A COMPLETE LINE
for every car, truck and bus on the road.
TUNG-SOL
SIGNAL FLASHERS
The instrument panel pilot light feature is an outstanding contribution to highway safety.
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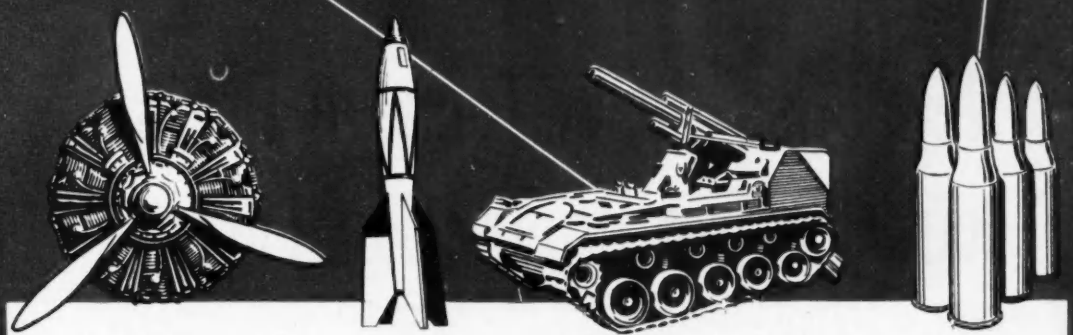
Greatly Increased Today, and Ready for Far Greater Demands Tomorrow!



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SHELLS and SHELL CASINGS

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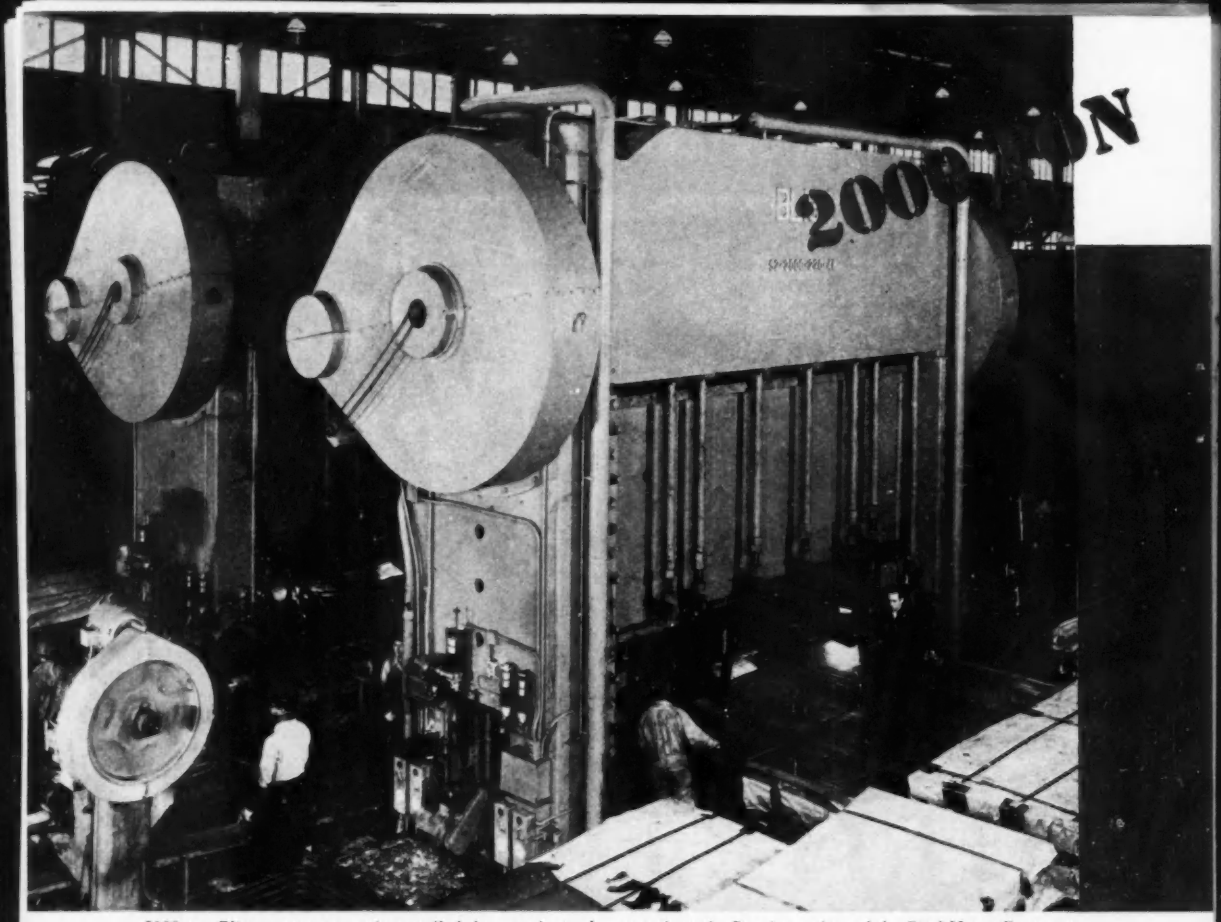
• Automotive Suppliers of wheels, brakes, hubs and drums for passenger cars, buses, trucks and tractor-trailer combinations • Electric brakes, brake power equipment, power chambers and valves for civilian vehicles; Foundry, machining, stamping facilities

7 GREAT PLANTS: McKeesport, Pa.; 2 Plants in Detroit; Jackson, Mich.; Davenport, Iowa; Los Angeles, Calif.; Windsor, Ont., Canada



2000-ton Bliss presses, recently installed, form and trim heavy rails at the Dearborn plant of the Ford Motor Company.

New Bliss Heavy-Tonnage Presses Join Ford Production Lines

Ford production lines' ever-increasing efficiency and reliability are no accident. They embody intensive studies of advanced equipment and techniques—especially in heavy-tonnage forming where improvement gives substantial savings. A case in point is the *new rail press line*—five Bliss 2000-ton presses recently installed by Ford.

Unusual design features provide capacity to spare and protection against downtime even with steady 'round-the-clock operation:

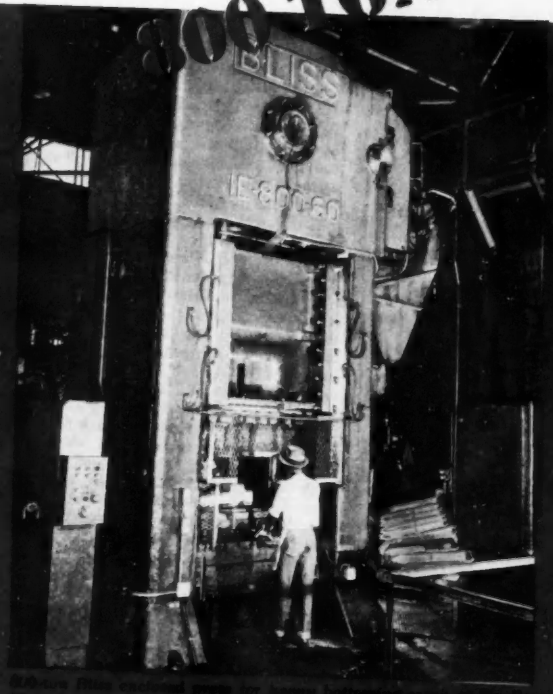
- Extra-deep crown, bed and slide members minimize deflection
- Crankshaft construction withstands most severely unbalanced loads
- Crankshaft jointed at center; simplifies maintenance, cuts down on floor area needed
- Twin pinions and intermediate gears distribute load on intermediate shafts
- Oversize crankshaft, clutch and brake reduce possibility of downtime

These design highlights show how Bliss' creative press engineering is applied to particular metal forming operations. *You* can get Bliss started on *your* special press engineering by calling your local Bliss representative. Virtually a production counselor for metal stampings, he is your liaison with Bliss' engineering staff, and can recommend equipment and methods...advise you about production rates and costs.

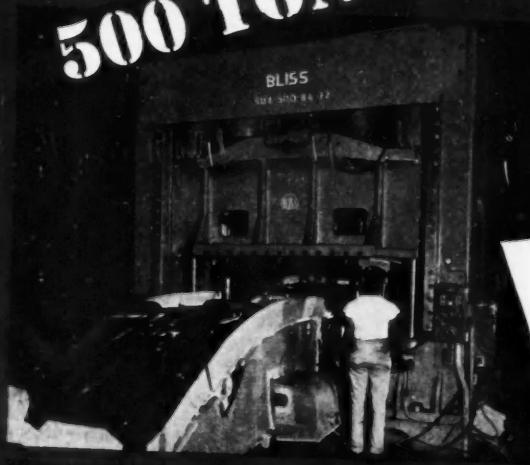
E. W. BLISS COMPANY, CANTON, OHIO

Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery

300 TON



500 TON



For Heavy-Tonnage Presses—
Mechanical or Hydraulic...

It's Bliss

Not One Cent for BUCKEYE Tool Maintenance!

TOOL SERVICE RECORD

Tool.....BUCKEYE Vertical Sander
Power.....Air
Capacity.....9" Pad
Speed.....4500 RPM
Job.....Weld grinding and abrasive cutting

TOTAL TOOL MAINTENANCE AND REPAIR COSTS

April 1950—
January 1952..... **$0.00**

In April, 1950, a Buckeye vertical sander was purchased for use in the shop of a leading textile plant. The tool was chosen for its greater power output and for its adaptability to a wide variety of grinding and sanding jobs.

By January, 1952, this Buckeye sander proved to have still another advantage: In twenty months of continuous service, not one cent had been spent for tool repairs!

The Master Mechanic has just bought a second Buckeye sander, chiefly because: "If two jobs requiring the use of a sander are in process at the same time, the men prefer to wait until the Buckeye tool is available."

Still not using Buckeye tools in your plant? You could be missing out on real savings, on production costs as well as maintenance. It will cost you nothing to try Buckeye—on your own job—without any obligation.

Buckeye Tools CORPORATION
DIVISION 21 • DAYTON 1, OHIO

Portable Air and Electric tools for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

SAE Meeting

(*Continued from page* 124)

positional control should be based on silicon content, rather than carbon or phosphorus contents. Carbon exerts little effect on the strength or other properties of ductile iron. Phosphorus decreases the strength as-cast, and should be restricted to the lowest practical level. The maximum strength in all sections is secured at 1.5-2.5 per cent silicon, with lower strengths at higher and lower silicon levels. Tensile strengths in excess of 100,000 psi can be secured in 1 to 2 inch sections.

Considerably higher tensile strengths may be secured by heat treatment of ductile iron. This material can be oil or water quenched without undue danger of cracking in fairly uniform sections. High strengths in the range of 130,000 to 150,000 psi can be obtained by oil quenching or air cooling, then tempering at 1100-1200 F or by isothermal transformation at 1100-1200 F.

Maximum elongation is obtained by full annealing of ductile iron to produce a fully ferritic matrix. In this condition, elongation in excess of 25 per cent is obtainable in sections up to three inches thick. In general elongation decreases with both increasing silicon content and increasing section size, so that controlled ductility may be secured by a proper balance of silicon content and section size.

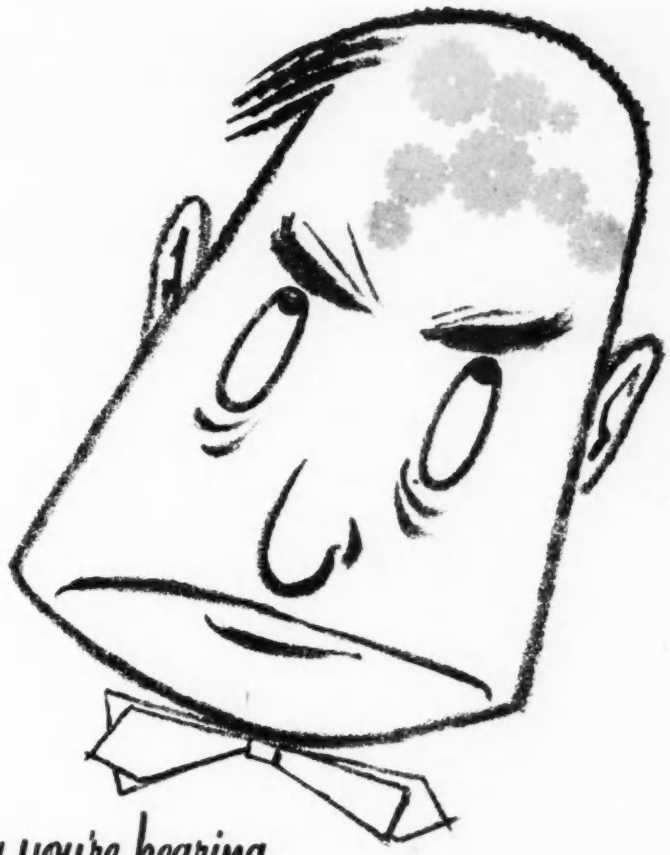
In the annealed sections which possess the high ductility characteristic of ductile iron, the tensile and yield strengths are directly dependent on silicon content and section size.

Defects in T-41 Tanks Reported Corrected

According to a recent statement by Major General J. K. Christmas, chief of the Army's Procurement Div., defects in the new T-41 Walker Bulldog light tank have been corrected. A number of the tanks, produced at a Government-owned plant in Cleveland, O., had been rejected because of a turret defect which did not permit leveling the turret gun at the anticipated speed. The turret is designed so that the gun will remain trained on its target regardless of the angle at which the tank is traveling.

French Gasoline Price Takes Jump Upward

French motorists are reported irate over the government's new tax on gasoline which raises the selling price to 64 francs ($.70) per litre. Now second only to Italian gasoline in price, the new figure is said to have been calculated on a 22 per cent rise in the cost of fuel, 11 per cent higher commercial charges, and 67 per cent taxes.



If it's gearing you're hearing

...TRY C-D-F CELORON

Light weight: ½ weight of Al, 1/7 weight of brass. Lighter, more modern gears for modern machines.

Easy to Machine—use a hobber, milling machine or gear cutter. Machines fast — save money on every blank cut!

Tensile strength of 10,000 lbs. per inch—yet has resilience. Resists corrosive chemicals.

• Noisy clashing gears mean loss of efficiency—design weakness—maintenance trouble spots—that's why designers "build in" gear reliability with C-D-F Celoron gears.

Silent Celoron is the hi-strength, non-metallic thermosetting plastic gear stock that is standard for automotive timing gears, textile machinery, printing presses and thousands of other uses.

Your C-D-F sales engineer is a good man to know (offices in principal cities). Consult with him on your gear problems. He'll save your time and money. Call him today.

CDF

Continental-Diamond Fibre Company

GENERAL OFFICES:

NEWARK 2, DELAWARE

Nothing is as smooth as a

HOOVER HONED RACEWAY*

POLISHED
Polished Raceway surface magnified 100 times as used in other ball bearings
*HOOVER HONED
Raceway surface magnified 100 times, as used exclusively in Hoover Ball Bearings.
HOOVER

It's the raceway that makes the difference

HOOVER
America's only
BALL BEARING
with Honed Raceways

90% longer life
30% greater load
Amazing Quietness

The Aristocrat of Bearings

HOOVER BALL AND BEARING CO.
ANN ARBOR, MICHIGAN

CALENDAR

OF COMING SHOWS AND MEETINGS

Chicago Automobile Show, Chicago, Ill. ..... Feb. 16-24

National Transport Vehicle Show & Fleet Maintenance Exposition, New York ..... Feb. 26-28

Pacific Automotive Show, Los Angeles, Calif. ..... Feb. 28-Mar. 2

Fifth Annual Hot Rod and Motor Sports Show, Los Angeles, Calif. Feb. 28-Mar. 2

Amsterdam Automobile Show, Amsterdam, Netherlands .. Feb. 29-Mar. 10

ASTM Spring Meeting, Cleveland, Ohio ..... Mar. 3-7

SAE Passenger Car, Body and Materials Meetings, Detroit, Mich. .. Mar. 4-6

Fifth National Plastics Exposition, Phila., Pa. ..... Mar. 11-14

ASTE Industrial Exposition, Chicago, Ill. ..... Mar. 17-21

Geneva Automobile & Truck Show, Geneva, Switzerland ..... Mar. 20-30

First Annual American Power Conference, Chicago, Ill. ..... Mar. 26-28

American Society of Lubrication Engineers, Seventh Annual Meeting and Lubrication Show, Cleveland, Ohio ..... Apr. 7, 8, 9

SAE Aeronautic Meeting, New York, N. Y. ..... Apr. 21-24

Turin Automobile Show, Turin, Italy ..... Apr. 23-May 4

Metal Powder Show and Eighth Annual Meeting, Chicago, Ill... Apr. 29-30

International Foundry Congress and Show, Atlantic City, N. J. ... May 1-7

API Div. of Refining, San Francisco, Calif. ..... May 12-15

Society of Experimental Stress Analysis, Spring Meeting, Indianapolis, Ind. ..... May 14-16

American Society for Quality Control (sixth annual meeting), Syracuse, N. Y. ..... May 22-24

Memorial Day 500 Mile Race, Indianapolis, Ind. ..... May 30

SAE Summer Meeting, Atlantic City, N. J. ..... June 1-6

Third Annual Conference on Industrial Research, Columbia Univ., New York, N. Y. ..... June 9-13

National Truck, Trailer and Equipment Show, Los Angeles, Calif. June 12-15

Industrial Finishing Exposition, Chicago, Ill. ..... June 16-20

American Society for Testing Materials (annual meeting), New York City ..... June 23-27

SAE West Coast Meeting, San Francisco, Calif. ..... Aug. 11-13

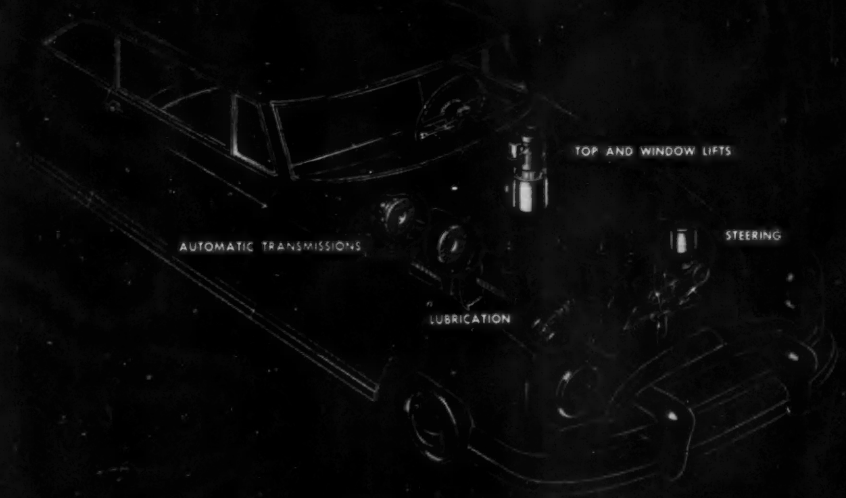
American Standards Asso., Third National Standardization Conference, Chicago, Ill. ..... Sept. 8-10

Instrument Society of America (sixth annual meeting), Cleveland, Ohio ..... Sept. 8-12

SAE Tractor Meeting, Milwaukee, Wis. ..... Sept. 9-11

Paris Automobile Show, Paris, France Oct. 2-12

37th International Motor Exhibition, London, England ..... Oct. 15-22



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Belgian Automobile and Truck Show

(*Continued from page* 33)

Canada. In addition to this it is intended to extend the manufacturing facilities for assembly organizations in Europe.

With the exception of the many newcomers from Germany, very few entirely new passenger cars were on exhibition. Rover showed the gas turbine model for the first time outside England, but stated that this was not yet a commercial proposition and that the reports of a new turbine with heat exchanger were premature.

One of the largest stands in the show was that occupied by Ford, on which were displayed American cars, Belgian assemblies, the Taunus from Germany, the Zephyr and the Consul from England, and the Vedette and the Comet from France. Space was reserved for Ford's 1952 models which, owing to transport difficulties, did not arrive until some time after the opening date. The Ford for '52 is equipped with either the V-eight engine of 240 cu in. or the short stroke, valve-in-head six of 215 cu in. The car is offered in Europe with standard, overdrive or automatic transmission.

An important feature of the show was the powerful comeback of the German industry in all types of vehicles from the smallest passenger cars to the biggest trucks, thus creating competition which is having to be met by America, England, France and Italy. Mercedes was practically alone in the high-grade field, with two expensive six-cylinder models. Volkswagen is the biggest seller in the medium size class and is undercutting France and England. This leaves the two extremes—the very small, economical two and four-passenger car and the full range of trucks.

Seven makes figured in the small-car class, with two-stroke engines varying from 24 to 42 cu in., all with either front mounting and drive or rear mounting and drive. They were I.F.A., Gutbrod, Goliath, D.K.W. (Auto Union), Lloyd, Champion, and Kleinstwagen.

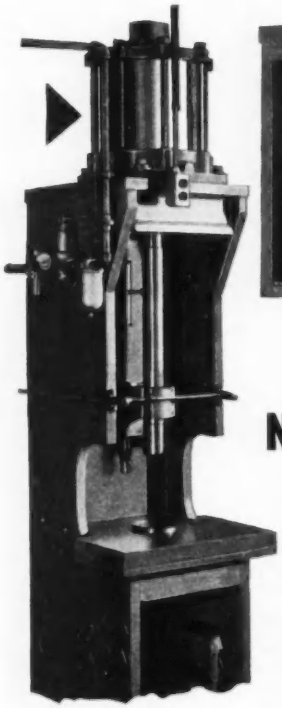
Gutbrod and Goliath were distinctive in the adoption of the direct injection system developed by Robert Bosch for two-stroke engines. The Goliath has a vertical two-cylinder, two-stroke engine of 42.7 cu in. displacement, set across the frame, with clutch and transmission in line, and driving to the independently sprung front wheels. One of the features of this fuel injection system differing from that for heavy oil engines, is the supply of lubricant to the pump and also to the injected gasoline. The Gutbrod is a rather smaller engine, of 36.6 cu in. piston displacement. Its two vertical cylinders are water cooled, and drive is to the front wheels.

The D.K.W. (Auto Union) had a water-cooled, two-cylinder, two-stroke in-line engine with clutch and four-speed transmission forming a unit, set ahead of the transverse spring and driving to the front wheels, the radiator being mounted above the cross spring back of the engine.

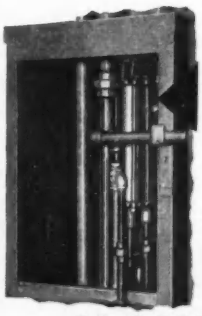
The I.F.A., built at Chemnitz, is very similar to the D.K.W. with an engine of the same type and the same size, embodying the same transmission. An option is a three-cylinder engine of 55 cu in. with four-speed transmission. These cars have a wheelbase varying from 90 to 95 in., they carry two-door four-passenger sedan bodies, and weigh complete from 1700 to 1760 lb.

Still smaller was the Lloyd, with a twin cylinder, air-cooled vertical two-

(*Turn to page* 136, *please*)



NOPAK Model "D" Heavy Duty Cylinder provides power stroke for "squeeze assembly" operation.



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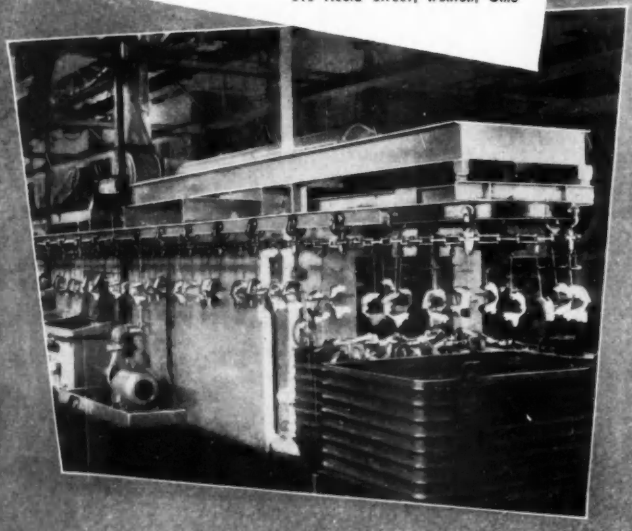

Belgian Show

(*Continued from page* 134)

stroke engine of only 18 cu in. displacement, having front wheel drive in a central tubular chassis. In the Champion the engine was a water-cooled 24 cu in. twin, also with front wheel drive in a central tube chassis. The Kleinstwagen offered two engines, a 24 cu in. water-cooled, two-stroke, or an aircooled 21 cu in. flat twin, both with rear mounting and rear drive. The Kleinstwagen made use of rubber bands for suspension.

The whole of the truck display in the Brussels show was greater than that of passenger cars, but the only vehicles not having previously been on exhibition were those from Germany. Mercedes-Benz presented a 75-passenger coach, the 0-6600 H, with a six-cylinder Diesel mounted transversely on a rear extension of the main frame. with a piston displacement of 505 cu in., output was 145 hp at 2100 rpm. This unit comprised a single plate clutch and a six-speed Z.F. transmission with electric control. From the transmission housing the drive was carried forward by a two-piece drive shaft, the two parts having different angles, with a bearing between them, to the beam-type axle. A feature of the suspension, which was by semi-elliptic springs front and rear, was the use of transverse torsion bars, on the ends of which radius arms were mounted with rubber block connection to a beam anchored under the spring clip pad. The other end of this beam formed the anchorage for the hydraulic shock absorbers attached to the outside of the side rails. With a wheelbase of 215 in., the Mercedes Pullman had a front overhang of 100 in. and a rear overhang of 118 in.

Bussing, handled in Belgium by the Imperia Automobile Co., presented an under-floor, six-cylinder Diesel bus chassis, the engine being centrally placed under a slightly upswept section of the side rails, and driving by an offset open shaft to a double-reduction rear axle. It was stated that a three-axle vehicle with 12-speed automatic transmission was in preparation. Among other Bussing offerings were four-wheel drive trucks with forward mounted six-cylinder Diesel engines.

MAN presented a variety of Diesel types, including a six-cylinder with exhaust driven blower, a V-eight of 180 hp, a rear mounted six-cylinder, set fore and aft and slightly inclined, and a four-wheel drive truck with front mounted engine.

The feature of the Krupp Sudwerke was a 7½-ton vehicle with a four-cylinder, vertical, two-stroke Diesel of 145 hp, fed with air through a belt-driven, geared-up Roots type blower. Exhaust valves were mounted in the

(*Turn to page* 138, *please*)

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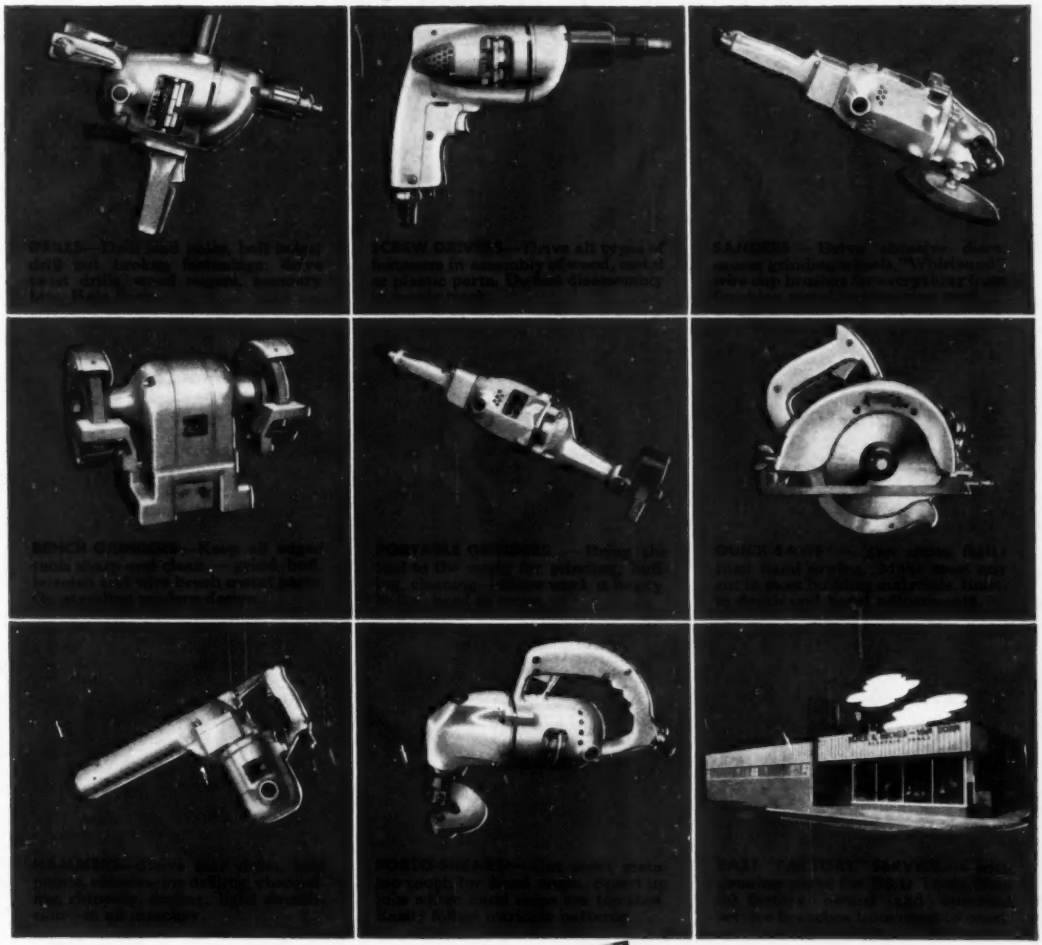

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B&D Black & Decker PORTABLE ELECTRIC TOOLS

Belgian Show

(*Continued from page* 136)

head, and air was admitted through ports uncovered by the piston stroke. This forced air circulation assisted in the cooling of the cylinder barrels, the head and the upper portion of the cylinders being water cooled. The Sudwerke series comprises motors with two, three, four and six cylinders, of respectively 75, 110, 145 and 210 hp, all on the same general lines of construction.

Air-cooled Diesels were represented by the Deutz, as fitted to the Magirus and Faun trucks. These, which are one, two, three, four and six in-line types, in addition to a six and a V-eight, have the same general lines of construction, with separate finned cylinders, a centrifugal belt-driven turbine, and a ducted draft of air passing over the heads and cylinder barrels.

The E.M.W. (Eisenacker Motoren Werke) appeared as Western Germany's version of the B.M.W., produced in the Russian zone, at Munich. It is claimed that there is no difference between the E.M.W. and the original B.M.W. design. The engine is a six-cylinder, valve-in-head unit of 122 cu in., developing 60 hp. Three types are built, the principal differences being in the suspension.

The Horsepower Race

(*Continued from page* 49)

of engines range—7.2, 7.1, and 7 to 1.

Significant, too, is the fact that only Cadillac, Oldsmobile, Buick and Lincoln make use of premium fuel imperative. The rest are said to be capable of operating on regular fuel with factory adjustment.

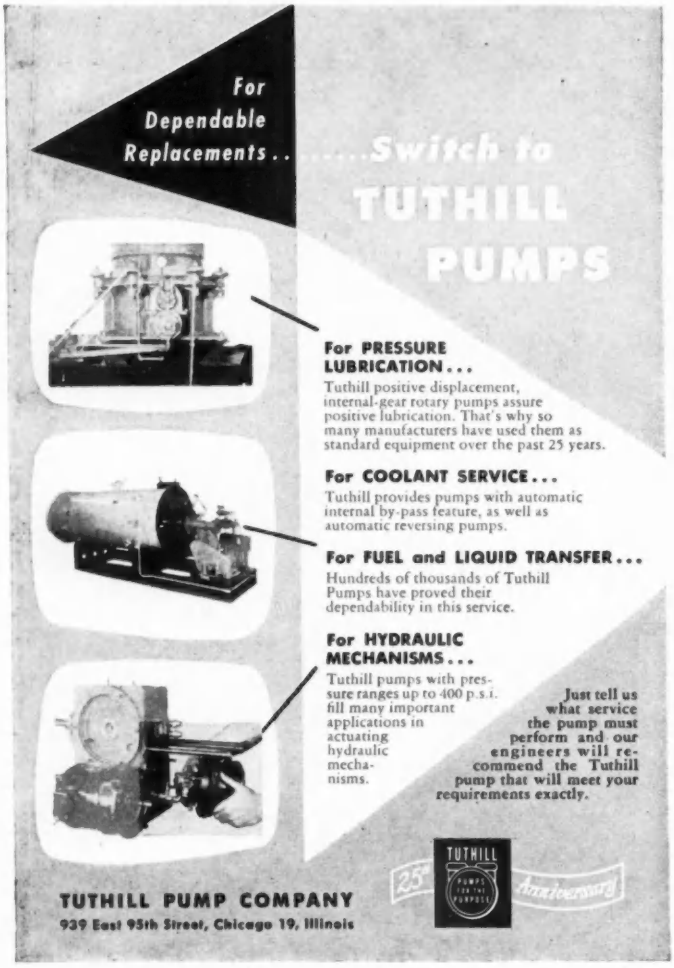
To the writer, the most significant aspect of the status of engine design is found in amazing flexibility of current engines. Consider first the Cadillac engine. The basic engine rated 160 bhp has been boosted to an output of 190 bhp without change in specifications data and without disturbing the major elements. This was accomplished primarily by the introduction of the four-barrel carburetor, accounting for the greater part of power increase; by increasing breathing capacity through enlargement of the entire induction system; and by changing the exhaust system. In this connection, Cadillac has introduced separate exhaust manifolds, piping, and muffler system, with separate outlets at the rear. Mufflers are a little more complicated, and include a separate resonance chamber. In addition, exhaust valves have been increased by ⅛ in. in diameter.

There is no change in combustion chamber form or in compression ratio. Nor was there any change in the rotating or reciprocating parts. This ability to make major increases in output without affecting basic construction speaks well for the soundness of the initial design of the engine.

In the case of Oldsmobile, the basic Rocket engine was increased in rated output from the former 135 bhp to 160 bhp. This was accomplished essentially through the introduction of a single external accessory — the four-barrel carburetor. In addition, valve lift was increased slightly to improve breathing. In the case of the Rocket engine, doubtless anticipating still further boosts in output, Olds introduced a heavier crankshaft with heavier counterweights, and pistons which were strengthened to carry the heavier loading.

Willys took its old reliable six-cylinder, L-head engine and boosted output from 75 to 90 bhp, an increase of 20 per cent, by converting it to F-head. Here the basic change involved the introduction of a new head and the addition of six push rods, operating from the same camshaft, together with the necessary rocker arm mechanism.

(*Turn to page* 140, *please*)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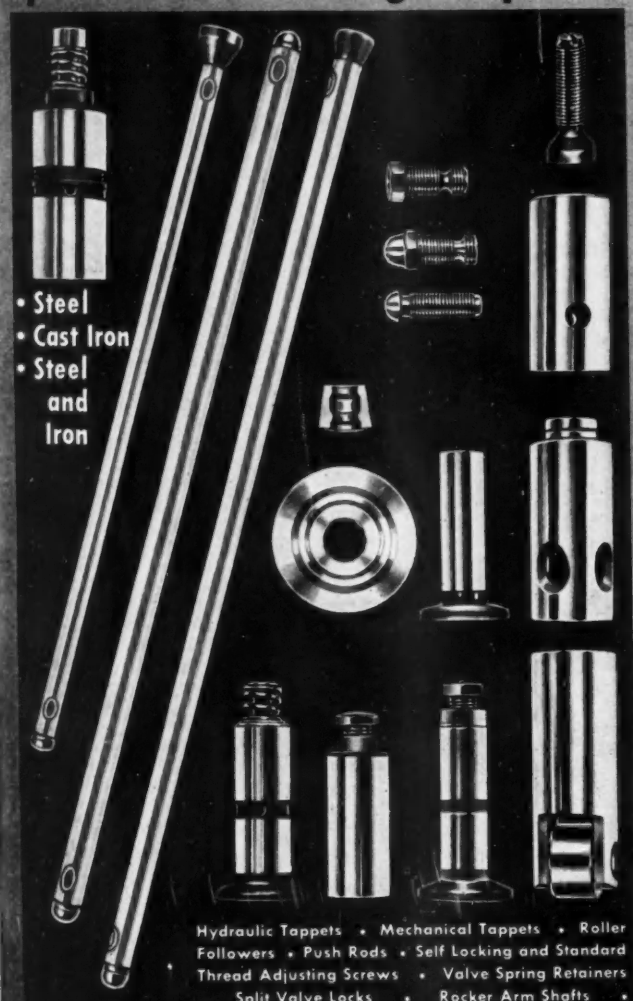

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Horsepower Race

(*Continued from page* 138)

Both Buick and Mercury increased output of their conventional engines primarily by the introduction of new carburetors—a four-barrel system on Buick, in combination with a new induction system; and a new type Holley concentric bowl carburetor for Mercury.

The other engines are entirely new and offered for the first time. To the observer, it is significant that the basic V-8 overhead valve engines now making their appearance promise to have relatively long amortization periods and are capable of large increases in output and performance characteristics without requiring major changes in design of parts and incidental tooling. This is indeed a happy circumstance, considering the vast investment in special production equipment, transfer machines in particular.

Just a brief comment on fuel economy. Up to recent years, the introduction of big engines was a liability for the car owner from the standpoint of fuel economy. In fact, one of the primary reasons for pushing small cars was because of their economy. Today a big engine is actually an asset from the standpoint of the owner. Proper combination of the power train in really big cars now promises fuel economy rivaling that of more conventional cars of moderate size.

We refer, of course, to economy figures by Cadillac owners and Chrysler owners, taking the largest power plants as an example. For several years the Cadillac power train has yielded economy figures beyond comprehension in the light of common experience. And now it is likely that the level of fuel economy for the entire gamut of new power plants may reach new high's.

It seems to the writer that fuel economy, particularly in cars in the higher and medium-priced ranges, is not so much a matter of the pocketbook as it is of tank mileage. With higher fuel economy the modern car will go farther on the filling, will require less service station stops on long trips. That is the essence of real economy—the ability to make long trips at higher average speed.

Similarly the surge to big engines is more a matter of safety than speed. After all the top speed of the big cars is not greatly increased percentagewise. But acceleration, hill climbing, and the ability to pass safely on the highway have been markedly enhanced. And these criteria make for greater safety on the highways as well as city streets.

Read AUTOMOTIVE INDUSTRIES

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Depth Bomb part drawn with Advance Dies from 31½" steel blank.

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Industry News

(*Continued from page* 23)

NPA Studies Reduction in Car Accessories

Of interest to the automotive industry are efforts of the National Production Authority to save materials through a reduction in output of automotive accessories. An industry task force has met with NPA to study the situation and is expected to have its recommendations ready soon. NPA's objective is to limit accessory production to 50 per cent of the first quarter of 1951. Industry representatives are talking about a system of classification of accessories in the order of essentiality on the basis of safety and function, with heaters and radios rating 100 per cent and dribbling off to 50 per cent on such items as tail pipe extensions, dual horns, and similar items.

Heaters obviously are essential, and radios can support such a claim on the basis of their use for communication in case of emergency, especially since automobiles are definitely an important part of any mass evacuation movement. The primary reason for suggesting the 50 per cent cut, rather than outright dropping of non-functional accessories, is that such a move would mean sudden death for small businesses manufacturing these items.

Chrysler Enlists Dealers in Dormant Scrap Drive

Chrysler Corp. has enlisted the aid of its 10,775 dealers in increasing collections of scrap metal. The company's entire field organization is working with dealers, while special articles in company publications and other promotional mailings point out effective ways of setting up dealer scrap drives.

Chrysler's scrap program has been going for several months and reached its high point in Dec., when 1,357,422 lb of scrap metal were shipped from Chrysler plants and those of vendors. A special staff is conducting the dormant scrap drive and reviews about 2500 parts numbers each month for possible scrappage of the tools required to produce them.

Reo Military Truck Contract Expanded

Reo Motors, Inc., has received a large additional letter order from Army Ordnance for 2½ ton military trucks and spare parts. The new business brings unfilled orders to more than $200 million. Reo has already shipped more than $100 million worth of trucks and spare parts to the military, in addition to several thousand engines supplied to Studebaker Corp. for military trucks.

Catalyst Developed for Better Engine Results

Associated Development and Research Corp. recently announced successful completion of preliminary tests of a new process that is said to result in better fuel and engine performance of internal combustion engines. Under the process, developed by Dr. Sophia Berkman, a snythetically compounded catalyst is cast in the cylinder head or piston. This is reported to prevent carbon formation and the destructive impact of knock or "ping."

Furthermore, it is claimed that the new catalyst, among its other functions, assists in a more complete combustion within the cylinder and thereby cuts down the need for higher octane gasolines.

Continental Motors Shows Profit Gain

Continental Motors Corp. has reported an increase in earnings for its fiscal year ended Oct. 31, 1951. Profit was $4,469,063, compared with $3,611,245 the previous year. Sales last year were more than $166.6 million, compared with $96.4 million in 1950.

(*Turn to page* 144, *please*)

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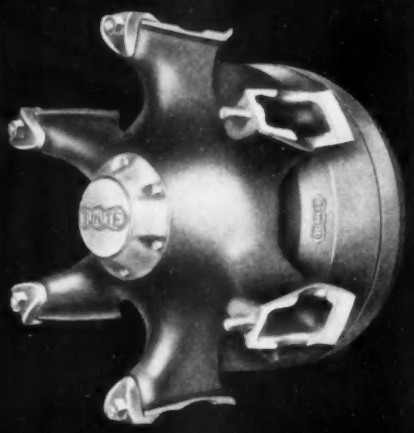

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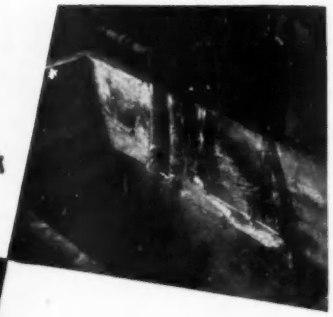

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at the Lycoming Spencer Division
Avco Corp., Williamsport, Pa.

The only time this Platecoil was removed in over a year at Lycoming Spencer was to take its picture. The single 22" x 23" Platecoil has heated a 100-gallon Parkerizing tank, in daily use, *without downtime.* Built of Electro-polished Stainless Steel, the Platecoil has required *no cleaning or repairs.* Any deposit that builds up on the coil during the course of operation is "shocked off" when the steam pressure is dropped in the coil.

Notice how easy it is to lift the Platecoil out of the tank when the time comes that it does have to be cleaned, repaired or replaced. There are just two connections to loosen and both are outside the solution. The Platecoil merely is lifted out of the tank and replaced with little or no delay in production.

Platecoils have other advantages, too. They have about twice the heating area for a given space than can be obtained with pipe coils. Thus smaller size Platecoils can be used to save initial cost, tank space and handling time.

Learn how you can cut your heat transfer costs by sending today for Platecoil bulletin No. 74.

PLATECOIL
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

Industry News

(*Continued from page* 142)

Tank Assembly Employment to Expand Widely in 1952

According to a recent survey made by the Bureau of Labor Statistics of the Department of Labor, employment in tank assembly is expected to total 45,000 by late 1952. This figure represents seven times the number employed prior to the outbreak of the Korean War, and it is expected that the assembly lines which this increased labor force mans will be capable of turning out 35,000 tanks a year.

The BLS report also stated that Michigan will continue to employ more workers in tank assembly than any other State, even at peak production, and employment will be heavily concentrated in the Great Lakes Region, in spite of the fact that it will be more widely distributed geographically than at present. Finally, the Bureau predicts that shortages of skilled labor will continue to be a problem.

Atnip Made President of Body Engineers

Harold V. Atnip, chief draftsman of the Body Design Dept. of Chrysler Corp.'s Engineering Div., has been elected president of the American Society of Body Engineers. He succeeds Harry G. Jarman of the Fisher Body Div. of General Motors Corp. Other new officers installed are: Kenneth E. Coppock, Fisher Body, vice president; Glen F. Doyle, Ford Motor Co., secretary; and Vernon F. Groeteka, Fisher Body, treasurer.

Affiliated Gas Awarded Contract for Jet Part

The Day & Night Div. of Affiliated Gas Equipment, Inc., has announced the award of a contract for the production of a major subassembly for the Northrop F-89 Scorpion all-weather jet fighter. The company is reported to have a backlog of approximately $35 million in defense orders, including components for tanks, rockets, shells, and aircraft.

P. R. Mallory Undertakes Expansion of Two Divs.

A $500,000 expansion program, which will provide new facilities for the Capacitor, and Metals & Ceramics Divs., has been announced by P. R. Mallory & Co., Inc. An additional 35,000 sq ft of manufacturing space will be added to the Capacitor Div. for the manufacture of electrolytic capacitors. The Metals and Ceramics Div. will contain an additional 27,000 sq ft of manufacturing space.

(*Turn to page* 147, *please*)

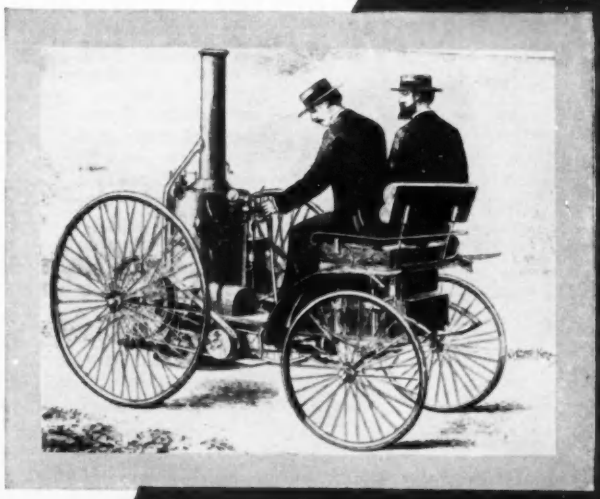
Morse *means* Timing Chains

This portable volcano of the 1880's resembles its modern, automotive offspring no more closely than its cumbersome system of belts, pulleys, and gears resembles today's accurate, smooth-running Morse Chain Drives.

This is one of a series of old prints of old machines (and ways of power transmission) that will appear in Morse advertisements. Write for your free, enlarged copy, suitable for framing for your collection.

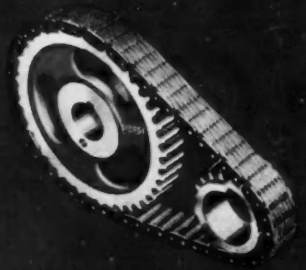
IN THIRTY-SEVEN YEARS of close collaboration with the automotive industry, Morse has produced 54,000,000 timing chains. Each one of the 54,000,000 has borne eloquent testimony to Morse's reputation as the leading manufacturer of automotive timing chains.

MORSE CHAIN COMPANY
7601 Central Ave. • Detroit 10, Michigan



MORSE
MECHANICAL
POWER TRANSMISSION
PRODUCTS

PRODUCTS OF B-W BORG-WARNER



THE SEAL OF COOPERATIVE RESEARCH

YOUR PRODUCT still on the drawing board?...

...NOW is the time for SIRVENE

Yes, drawing board time is Sirvene time if your new product will require diaphragms, boots, gaskets or other critical pliable parts of unusual or intricate design. Many a seemingly "impossible" critical parts problem . . . completely different in physical properties and operational characteristics . . . has been satisfactorily solved by Sirvene through early C/R cooperative research and engineering.

Sirvene is the name for Chicago Rawhide's scientifically compounded elastomers (synthetic rubber) which withstand extreme heat or cold, dryness or excessive moisture, oil, water, chemicals or any other conditions where ordinary pliables fail.

Whatever your need, Sirvene research and engineering will create a special design, develop a new compound, then mass-produce the necessary part to your specifications with micrometric accuracy. You'll have the *exact* degree of flexibility, hardness, resistance to temperatures, fluids, gases, abrasion and wear, or other qualities you may require.

On land, sea and air, Sirvene is serving in thousands of critical and difficult situations. It can do the same for you.

CHICAGO RAWHIDE MANUFACTURING CO.
1310 Elston Avenue SIRVENE DIVISION Chicago 22, Illinois

The cooperative research and engineering services which C/R has provided in producing special Sirvene synthetic rubber parts for leading manufacturers, are also available to you. We will be pleased to send you any further information you wish. Brochure on request.

C/R SIRVENE
SCIENTIFICALLY COMPOUNDED ELASTOMERS

sirvis
Mechanical Leather Products
Boots, diaphragms, packings and other products give dependable service under difficult operating conditions.

PERFECT Oil Seals
C/R seals are used in more motor vehicles, farm implements and industrial machines than any other shaft-type sealing device.

Representatives in These Principal Cities
Boston • New York • Syracuse
Philadelphia • Pittsburgh • Cincinnati
Cleveland • Detroit • Peoria • Minneapolis
Kansas City • Houston • Los Angeles
San Francisco

Industry News

(*Continued from page* 144)

Aluminum Association Holds Annual Meeting

Progress reports on the aluminum industry's expansion program featured the recent annual meeting of The Aluminum Association. Current industry problems were discussed in separate sessions held by the Association's four active commodity divisions.

A. P. Cochran, Cochran Foil Co., Inc., Louisville, was re-elected president of the Association for the ensuing year, and Arthur V. Davis, Aluminum Co. of America, was re-elected chairman of the board. Vice presidents re-elected were I. T. Bennett, Revere Copper and Brass, Inc.; L. M. Brile, Fairmont Aluminum Co.; and E. G. Fahlman, Permold Co. Directors elected for three-year terms were: Frank B. Cuff, Aluminum Co. of America; R. G. Farrell, Fairmont Aluminum Co.; and W. A. Singer, Apex Smelting Co.

ASQC Convention Plans Comprehensive Program

The Sixth Annual Convention of the American Society for Quality Control, to be held in Syracuse, N. Y., May 22 to 24, will feature a program designed to provide technical discussions and papers in such fields as: aircraft and aircraft industries; automotive; die stamping; electronics; precision manufacture; armed forces procurement; chemical; steel foundry and fabricating; gaging and gage laboratory, etc. Exhibits on display will include important phases of quality control activities and modern gaging equipment.

Dayton Rubber Earnings in 1951 Set a New High

According to its recent annual report, Dayton Rubber Co., in the fiscal year ended Oct. 31, 1951, achieved the highest sales and earnings in its history. Net sales were $54,602,954, compared with $37,199,454 for the previous year, an overall increase of 47 per cent.

Net profit for 1951 was $2,380,938 compared to net profits of $2,241,015 in 1950.

Bendix Sales Showed Sharp Rise in 1951

Net sales of Bendix Aviation Corp. for the fiscal year ended Sept. 30, 1951, were $340,540,415, an increase of $121,120,621, or 55 per cent over the previous year.

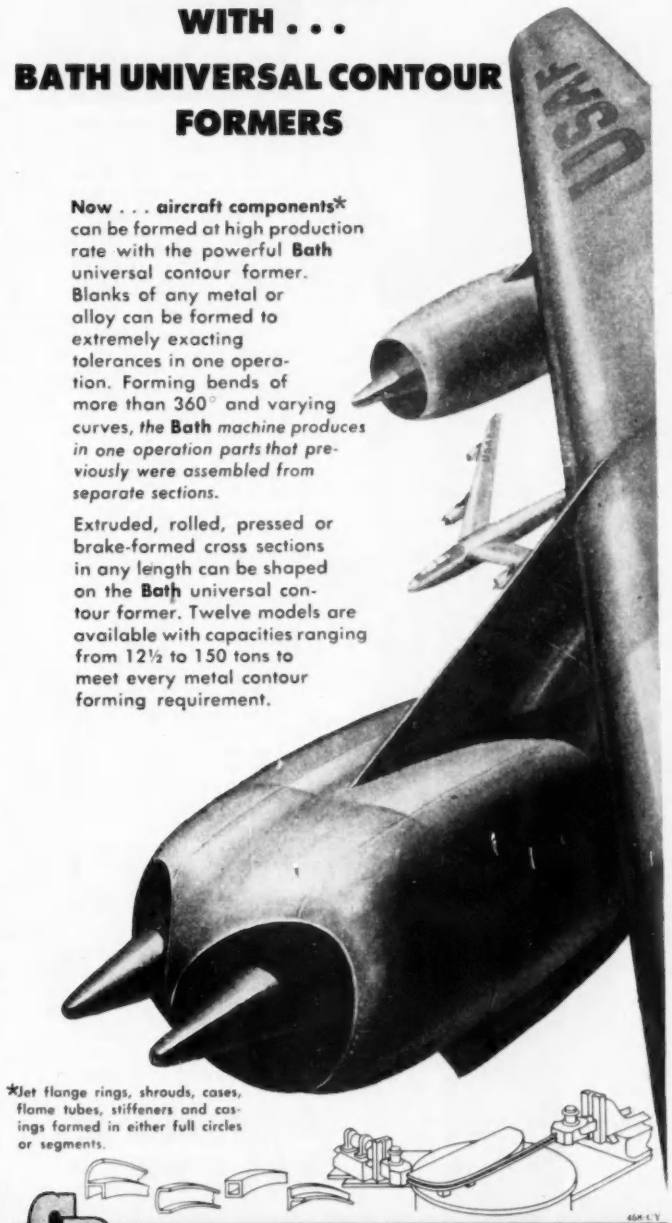
However, as a result of marked changes in taxes and other cost-price-profit relationships, net income for 1951 was $11,818,600, as compared with $16,954,116 in 1950.

(*Turn to page* 148, *please*)

STRETCH-FORM

FOR STRENGTH AND PRODUCTION WITH . . .

BATH UNIVERSAL CONTOUR FORMERS



Now . . . aircraft components* can be formed at high production rate with the powerful **Bath** universal contour former. Blanks of any metal or alloy can be formed to extremely exacting tolerances in one operation. Forming bends of more than 360° and varying curves, *the* **Bath** *machine produces in one operation parts that previously were assembled from separate sections.*

Extruded, rolled, pressed or brake-formed cross sections in any length can be shaped on the **Bath** universal contour former. Twelve models are available with capacities ranging from 12½ to 150 tons to meet every metal contour forming requirement.

*Jet flange rings, shrouds, cases, flame tubes, stiffeners and casings formed in either full circles or segments.

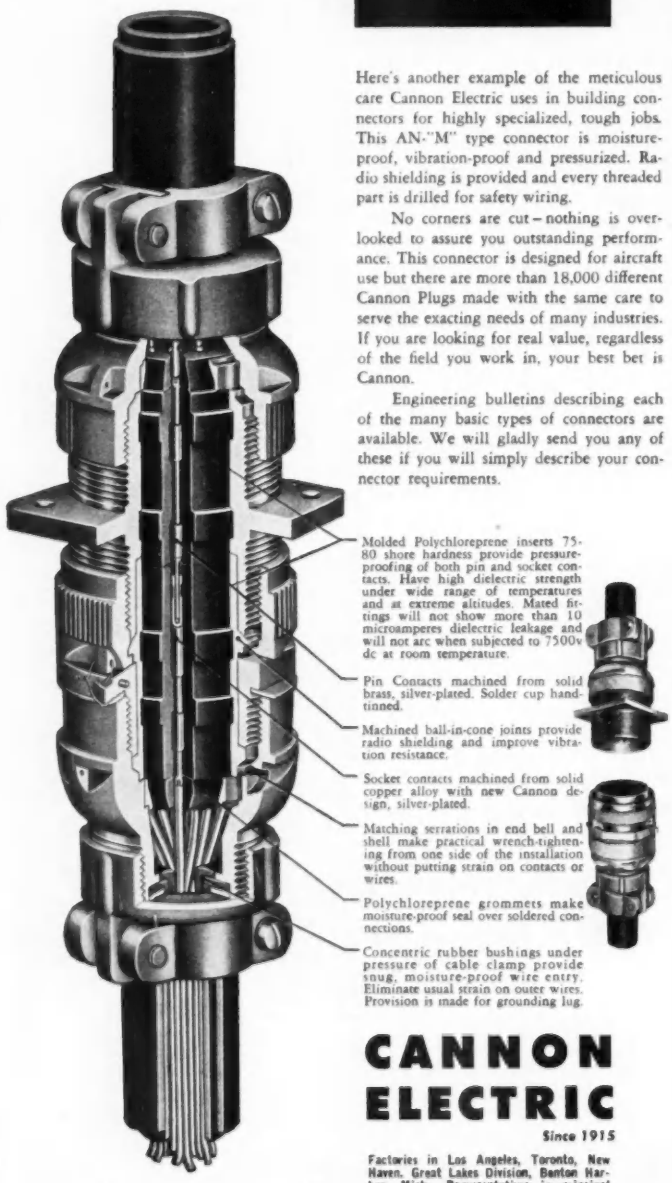
CB THE CYRIL BATH COMPANY

6915 Machinery Avenue • Cleveland 3, Ohio

Here's why those in the know

—demand

CANNON PLUGS


Molded Polychloreprene inserts 75-80 shore hardness provide pressure-proofing of both pin and socket contacts. Have high dielectric strength under wide range of temperatures and at extreme altitudes. Mated fittings will not show more than 10 microamperes dielectric leakage and will not arc when subjected to 7500v dc at room temperature.
Pin Contacts machined from solid brass, silver-plated. Solder cup hand-tinned.
Machined ball-in-cone joints provide radio shielding and improve vibration resistance.
Socket contacts machined from solid copper alloy with new Cannon design, silver-plated.
Matching serrations in end bell and shell make practical wrench-tightening from one side of the installation without putting strain on contacts or wires.
Polychloreprene grommets make moisture-proof seal over soldered connections.
Concentric rubber bushings under pressure of cable clamp provide snug, moisture-proof wire entry. Eliminate usual strain on outer wires. Provision is made for grounding lug.

Here's another example of the meticulous care Cannon Electric uses in building connectors for highly specialized, tough jobs. This AN-"M" type connector is moisture-proof, vibration-proof and pressurized. Radio shielding is provided and every threaded part is drilled for safety wiring.

No corners are cut—nothing is overlooked to assure you outstanding performance. This connector is designed for aircraft use but there are more than 18,000 different Cannon Plugs made with the same care to serve the exacting needs of many industries. If you are looking for real value, regardless of the field you work in, your best bet is Cannon.

Engineering bulletins describing each of the many basic types of connectors are available. We will gladly send you any of these if you will simply describe your connector requirements.

CANNON ELECTRIC

Since 1915

Factories in Los Angeles, Toronto, New Haven. Great Lakes Division, Benton Harbor, Mich. Representatives in principal cities. Address inquiries to Cannon Electric Co., Dept. B-126, P. O. Box 75, Lincoln Heights Sta., Los Angeles 31, Calif.

Industry News

(*Continued from page* 147)

Chrysler Assembly Capacity in Mexico is Increased

According to recent reports, the productive capacity of "Fabricas Auto Mex" (Mexican assemblers of Chrysler Corp. products) has been doubled as a result of the installation of new equipment and expansion of assembly plant facilities. The Chrysler assembly plant was first established in Mexico in 1940 and then had a capacity of eight to ten units daily. Since then, a series of expansions has taken place, and the new installations and improved equipment and assembly lines assure a production of 55 units daily.

Major improvement is the installation of ample rail facilities within the plant area with track sections sufficient to handle up to 20 freight cars at any one time for loading and unloading. The plant has its own fleet of 119 freight cars, which move between Mexico City and Detroit, Mich., and transport 750 to 800 carloads of parts annually for assembly in Mexico.

Alcoa and Reynolds to Install Mammoth Extrusion Presses

According to a recent announcement, a giant extrusion press, which is being installed at Aluminum Co. of America's Lafayette, Ind., Works, will exert a force of 13,200 tons. Leased from the Air Force, the press will produce larger, lighter and more intricate aluminum shapes for aircraft and other industries. It is claimed that ribbed airplane wing panel extrusions, for example, may be made in lengths up to 90 ft.

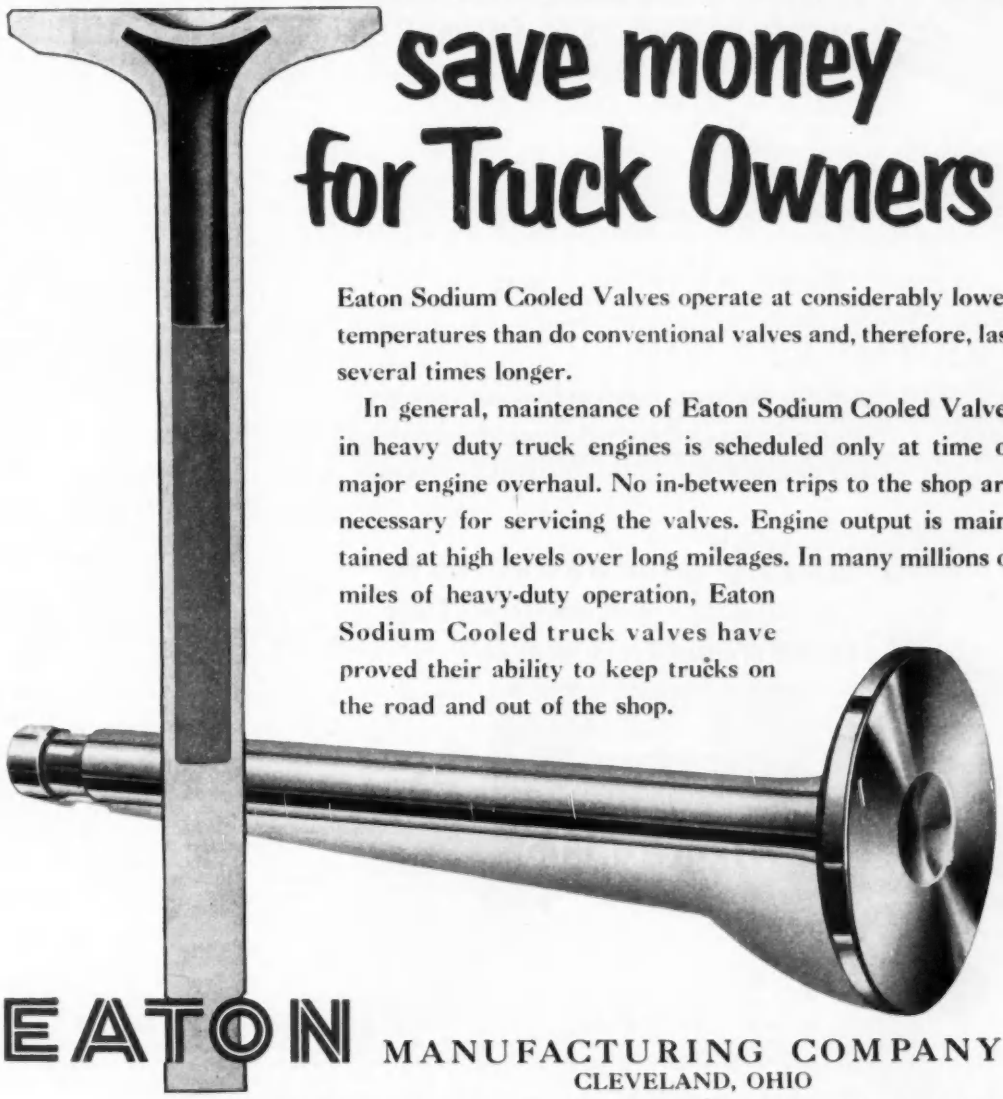
Reynolds Metals Co. also announced recently receipt of a multi-million dollar contract from the Air Force for the erection of a building at its Phoenix, Ariz., plant and the installation of two huge extrusion presses to turn out improved aluminum aircraft parts. The presses are said to be rated at capacities of 8000 and 12,000 tons, respectively.

1952 NADA Conclave Breaks Records for Attendance

At its recent 35th annual convention, the National Automobile Dealers Association chalked up an all-time high registration of 13,866 at the four-day meeting, and a record attendance of over 18,000 persons at the accompanying Equipment Exhibition, where 103 exhibitors showed their products and services. The following were elected officers of the Association: J. Saxon Lloyd, president; Robert S. Armacost, first vice-president; Foster W. Talbott, treasurer; and Carl E. Fribley, secretary.

(*Turn to page* 150, *please*)

Eaton
SODIUM COOLED VALVES
save money for Truck Owners



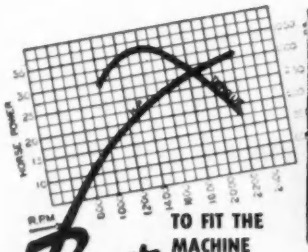
Eaton Sodium Cooled Valves operate at considerably lower temperatures than do conventional valves and, therefore, last several times longer.

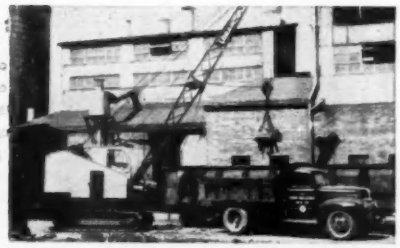
In general, maintenance of Eaton Sodium Cooled Valves in heavy duty truck engines is scheduled only at time of major engine overhaul. No in-between trips to the shop are necessary for servicing the valves. Engine output is maintained at high levels over long mileages. In many millions of miles of heavy-duty operation, Eaton Sodium Cooled truck valves have proved their ability to keep trucks on the road and out of the shop.

EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

VALVE DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers





Power TO FIT THE MACHINE AND THE JOB **WISCONSIN-POWERED**

Power Plants, Inc. Generator

Three carloads of scrap travel fast from freight cars to trucks every day with this crane on the job. It's equipped with a 36" ECM magnet, and the generator, built by Power Plants, Inc., Cleveland, Ohio, is powered by a Wisconsin Air-Cooled Engine.

Over and above time and labor saved through Wisconsin Engine dependability, servicing and maintenance are reduced to a minimum. For example, bearing failure is unheard of due to tapered roller bearings at both ends of crankshaft. Fool-proof air-cooling means no winter freeze-ups or summer overheating. And an easily-serviced OUTSIDE magneto with impulse coupling delivers all-weather quick starts. These features, combined with rugged construction, are the basis for the most dependable, most versatile power in the 3 to 30 hp. range . . . WISCONSIN POWER.

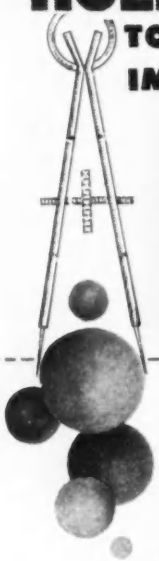
Write for details covering 4-cycle single-cylinder, 2-cylinder and V-type 4-cylinder models.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

HOLLEY DISCOVERS HOW TO SPARK A CARBURETOR IMPROVEMENT WITH

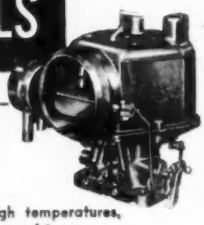


ACE

PRECISION

NYLON BALLS

Holley Carburetor Co., Detroit, uses Ace Nylon Balls as check valves in carburetors to permit a higher degree of spark advance.



For the first time . . . DuPont Nylon FM #10001 balls mass-produced to close tolerances. The result . . . toughness at low temperatures, form stability at high temperatures, light weight, chemical and abrasion resistance.

Hundreds of Industrial Applications! Let our engineers advise you.

Request samples and bulletin TODAY

SIZES 1/8"—3/4"
TOLERANCES ± .001

ACE PLASTIC COMPANY

Precision Plastic Fabricators and Extruders

ACE HIGH QUALITY TRADE MARK

91-46 VAN WYCK BLVD. • JAMAICA 2, N. Y.

Industry News

(*Continued from page* 148)

WASHINGTON CHECKERBOARD

Complete texts of Government agency regulations described briefly in this column may be obtained by writing the Information Div. of the agency concerned, Washington 25, D. C.

National Production Authority

Non-Nickel Bearing Stainless Steel (Dir. 9 to CMP Reg. 1; Dir. 1 to CMP Reg. 1 Amended)—removes this metal from CMP control.

Aluminum (M-5 Amended; Dir. 1, 2 and 3 revoked)—guarantees all holders of CMP allotments for aluminum positions on a mill schedule.

Procedures—Henceforth, all applications for priorities, materials, or any other type of assistance should be made out in triplicate, using a recently approved new form (NPA-132).

Personnel—On leave as president of the Columbus-McKinnon Chain Corp., **Franz T. Stone** has been appointed deputy administrator of NPA; **J. W. Mohler,** assistant director of sales for Caterpillar Tractor Co., will become deputy director of the Construction Machinery Div., March 15; and **Harry D. Brown,** on leave as assistant production manager of Gates Rubber Co., has been named deputy director of the Rubber Div.

Office of Price Stabilization

Used Passenger Automobiles (CPR 94, Amdt. 2)—announces a revised dollars-and-cents ceiling price schedule.

Domestic Lead and Zinc Ores and Concentrates (GCPR, SR 70, Rev. 1)—adjusts ceiling prices for these.

Rubber Products (CPR 22, SR 8, Amdt. 5)—describes method for determining ceiling prices for certain rubber products and adjustments where abnormal relationship exists.

Machinery Installation and Erection (CPR 30, Amdt. 30)—requires manufacturers, who perform installation and erection services in connection with sale of equipment, to price under CPR 93 covering such service.

Ford Motor Co. Passenger Automobiles (CPR 83, Sec. 2, SO 13)—authorizes increased "basic" retail dollars-and-cents ceiling prices for 1952 models and for factory-installed extra, special, or optional equipment.

General Motors Passenger Automobiles (CPR 83, Sec. 2, So 11)—same as above.

Hudson Passenger Automobiles (CPR 83, Sec. 2, So 12)—same as above.

Chrysler Corp. Passenger Automobiles (GPR-1192)—same as above.

Studebaker Passenger Automobiles (GPR-1193)—same as above.

Kaiser-Frazer Corp. Passenger Automobiles (GPR-1191)—announces approval of application for ceiling price adjustments.

Department of Commerce, Office of International Trade

Exports of Machine Tools and Metalworking Machinery (OIT-913) — announces that after Feb. 1, 1952, non-

(*Turn to page* 152, *please*)

Fifty years of specialized experience in the production of sleeve bearings, bushings and related products

Federal-Mogul

FEDERAL Mogul

Since 1899

FEDERAL-MOGUL CORPORATION
11037 SHOEMAKER, DETROIT 13, MICH.

QUALITY CONTROLLED
Pheoll
SCREWS, BOLTS, NUTS
and SPECIAL FASTENERS

SAVE STOCKROOM TIME

Requisitions to your stockroom for Pheoll Fasteners can be filled in less time. Boxes, kegs and packages are plainly marked with sizes clearly indicated for rapid identification. Pheoll's quality products handle easily, can be quickly counted or transferred to bins or assembly line trucks.

REDUCE ASSEMBLY TIME

Workmen gain time assembling with Pheoll screws, bolts, and nuts because they are accurately threaded, drive easily, seat rapidly, grip tighter—assuring stronger assemblies, easier inspection and less rejects.

IMPROVE YOUR PRODUCT APPEARANCE

The uniform quality of Pheoll Fasteners improves your product appearance. Precision slotted and finished heads, cleanly chamfered nuts, prevent marred surfaces and add to your product's sales appeal. Write for Pheoll literature and price list.

Save Costs... Increase Profits with these Pheoll Fasteners

ASK ABOUT PHEOLL Machine Screws† Machine Bolts Special Screws and Bolts Cap Screws Machine Screw Nuts Wood Screws† Thumb Screws Brass Washers Stove Bolts†

†Furnished in slotted and Phillips Recessed Head Types

Pheoll MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS
SCREWS • BOLTS • NUTS
Industrial Fasteners and Holding Devices

Industry News

(*Continued from page* 150)

portable, power-driven machine tools and metalworking machines will be licensed for export only if they are in possession of the license applicant or available to him on a rated order basis.

Exports of Automotive Replacement Parts (OIT-925)—states that licenses to export to certain Far Eastern countries no longer need be accompanied by copies of the import permits granted by those countries for such shipments.

Defense Production Administration

Magnesium Ingot Expansion Goal (DPA-229)—announces a goal for annual domestic production of 29,500 short tons of primary magnesium ingot in privately-owned plants and about 102,000 tons of primary ingot in reactivated Government standby facilities.

Canadian-U.S. Copper and Zinc Arrangement (DPA-236)—states that the Canadian Government has arranged to make available for export to the U.S. this year 15,800 short tons more of copper and 31,700 short tons more of zinc than in 1951.

Wage Stabilization Board

Special Case-Processing Procedures (Resolution 64, Amended)—announces that final decisions on all wage adjustment petitions involving some 11 automobile and parts companies will be made by Detroit Regional Board; also states that all tool and die industry cases will continue to be processed by the appropriate regional board.

Westinghouse Awarded Contract for Mill Electrical Equipment

Westinghouse Electric Corp. recently reported that it has been awarded an order of approximately $2 million for the main roll and auxiliary drive electrical equipment for Pittsburgh Steel Co.'s new 66-in. four-stand tandem cold strip mill at Allenport, Pa.

The order provides for two 1500-hp motors for stand No. 1 and six 2250-hp motors for stands 2, 3 and 4, as well as a 1200 hp double armature motor and magnetic brake for the take-up reel. Westinghouse engineers have stated that this marks the first time twin motor drives will be installed on all stands of a tandem cold strip mill.

J. I. Case Stockholders to Vote on 2-1 Split

Shareholders of J. I. Case Co. will vote on a 2 for 1 stock split at their annual meeting April 17. They also will vote on a proposal which would give shareholders rights to subscribe for additional stock on the basis of one share of Common for each five held. If the stock split is approved, it will be necessary to amend the company's articles of incorporation to increase authorized common shares from 1.2 million to 4 million and changing the par from $25 a share to $12.50.

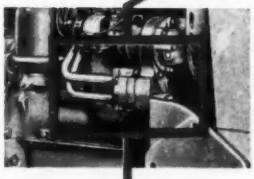
"WHEN YOU MEN FIND OUT WHAT'S NEW AT THE PLASTICS SHOW I'M BETTING YOU'LL HAVE THIS THING LICKED"

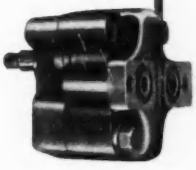
Every facet of the vast plastics industry will be concentrated in Philadelphia's Convention Hall. You will see what's *new* in research, raw materials, machinery, and production techniques. If there's an answer to your problem in the plastics industry, you'll find it at the Exposition. *This exposition is not open to the public. Requests for admission tickets should be written on your company letterhead to* THE SOCIETY OF THE PLASTICS INDUSTRY, Inc., 67 W. 44th Street, New York 18, N.Y.

1952 NATIONAL PLASTICS EXPOSITION
PHILADELPHIA CONVENTION HALL
MARCH 11 - 14 , 1952

PESCO HYDRAULIC POWER

ON FARMALL SUPER C TOO!





Small, compact, weighing only 3 lbs. Pesco hydraulic pump Model 051012 operates at 1200 psi and will pump 4½ gal. per minute at 2800 rpm.

For rugged, dependable duty in the fields, the powerful Farmall Super C tractor is equipped with a Pesco hydraulic pump. This pump powers the hydraulic system that gives complete finger-tip control of the tillage tools . . . control that makes farm work easier . . . lessens time spent in the fields. International Harvester uses smooth Pesco hydraulic power to do the heavy work on Farmall Cub, Super A and Super C. This is because Pesco hydraulic engineers have developed hydraulic pumps that give top-flight performance with little or no maintenance.

Perhaps Pesco equipment can help your products give the dependable service that wins customer loyalty. Why not write today for full information?

engineering Pesco production

PRODUCTS DIVISION

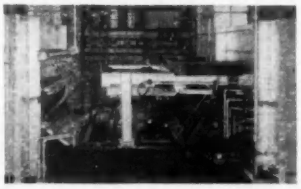
BORG-WARNER CORPORATION

24700 NORTH MILES ROAD BEDFORD, OHIO

HEAT TREATS SHELL FORGINGS—SCALE FREE

• The above illustration shows shell forgings being pushed through an EF gas-fired hardening furnace in parallel tubes filled with protective atmosphere. The forgings are then quenched automatically—reversed without coming in contact with air—and loaded into the tempering furnace.

Let EF engineers with their complete facilities, and the "know-how" gained on hundreds of shell, aircraft, tank, gun, bomb, cartridge clip, ammunition and other projects, help you convert to defense production.



Discharge End of the Hardening Furnace—the Quench, Automatic Reversing, and Loading Into the Tempering Furnace

EF

Gas-Fired, Oil-Fired and Electric Furnaces
for any Process, Product or Production
THE ELECTRIC FURNACE CO.
WILSON ST. at PENNA. R. R. *Salem - Ohio*

Quantity
PRODUCTION
of
GREY IRON CASTINGS

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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

BUY BONDS

MEN *in the* NEWS

(Continued from page 25)

National Automotive Fibres, Inc.—**John G. Bannister** has been named vice president in charge of manufacturing.

Thompson Products, Inc., Toledo Steel Products Co. Div.—**Carl L. Kahlert** has been appointed executive head.

Ford Motor Co., Lincoln-Mercury Div.—**E. D. Williams** has been chosen production manager, engine assembly and test, and **C. E. Humphries** as production manager, engine machining.

Tinnerman Products, Inc.—**William H. Taylor** has been appointed general sales manager.

Pacific Airmotive Corp.—**Charles F. Hamlin** has been named general counsel and assistant secretary.

Jack & Heintz, Inc.—**Ralph J. Eschborn** has joined the organization as staff engineer.

Narmco, Inc.—**A. R. Kemp** has joined the company as vice president.

A. O. Smith Co.—**Edward F. Nier** has been named liaison engineer.

Baker-Raulang Co.—**G. B. Davis** has been elected vice president in charge of sales.

Ford Motor Co. of Canada, Ltd.—**George H. Jackson** has been appointed vice president, sales and advertising, while **Paul R. Gillis** has been promoted to general manager of the Parts and Accessories Div.

Sam Tour & Co., Inc.—**Henry N. Shoiket** has been made head of the Mechanical Engineering Dept.

Aluminum Co. of America—**B. J. Fletcher** has been promoted to chief hydraulic engineer.

Westinghouse Electric Corp.—**C. F. Sponsler** has been named manager of the land transportation section of the Transportation Dept.

E. I. DuPont de Nemours & Co., Inc.—**Manfred Keller** has been chosen market research manager for the Textile Fibers Dept.

Norton Co.—**Everett M. Hicks** has been elected vice president and a director.

Goodyear Tire & Rubber Co., Mechanical Goods Div.—**A. L. Steele** has been appointed manager of the Automotive Jobber Dept.

at FORD...

Protective packaging for a precision part

IN SPARKLING ALCOA FOIL

"Give her the gas" means extra work for the Genuine Ford Economizer Valve. Functioning under loaded conditions, or at high speeds, this small precision part supplies additional fuel to the carburetor.

Replacement valves—shipped round the world—must be protected from dirt, moisture, heavy contact. Ford packaging experts solve this problem with a foil-lined tube that acts as a vapor barrier, protects the sensitive neoprene diaphragm from oxidation . . . allows packaging of more units, *with less effort*, in a single container.

If your product needs protective packaging, consider the many possible applications of Alcoa Aluminum Foil. Though current supplies are limited by military requirements, we will gladly send you the names of leading packaging firms qualified to advise you on material availabilities as well as to assist you with present or long-range packaging problems.

Write to: Aluminum Company of America, 1765B Gulf Building, Pittsburgh 19, Pa.

ALCOA
ALUMINUM

Package shown manufactured for Parts & Accessories—Ford Division by Cleveland Container Corp.

You can count on Continental

SIX ACRES OF PRODUCTION

Continental has more than six acres of plant production for making HOLTITE and other screw fasteners. Equipment and facilities are unsurpassed. Products consist of a complete line of commercial and industrial fasteners in all standard sizes, types, styles, metals and finishes with slotted or Holtite-Phillips recessed heads. Special fasteners can be made to your exact specifications.

HOLTITE Screws are the kind of fasteners that make America strong. They bind our nation together and keep it from splitting out at the seams. They hold our automobiles and aircraft, our ships and trucks and trains together. Without them we would have no radios, refrigerators, dishwashers or appliances. They are an integral part of the machine tools that make the machines that multiply the productivity of our labor. They even fasten the doors to our homes. In peace or war they are sinews of strength.

Whenever you need to put things together better, faster or stronger *you can count on* HOLTITE *fasteners and the Continental Screw Company,* New Bedford, Massachusetts.

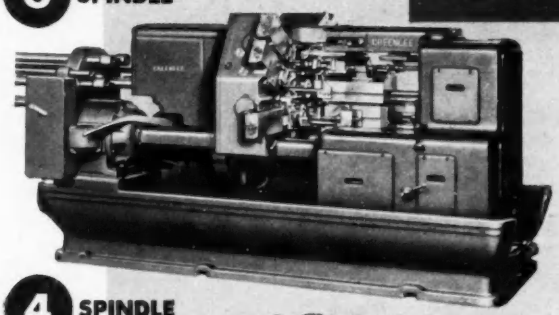
CONTINENTAL SCREW COMPANY INC. 1904

HOLTITE *Engineered* FASTENINGS

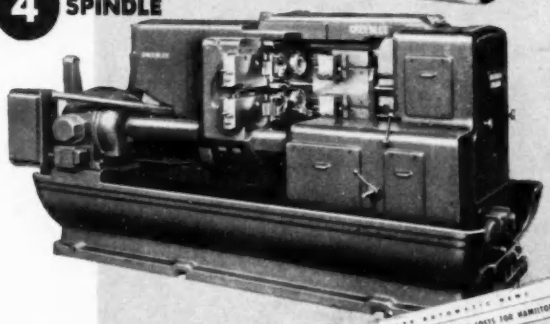
Copyright 1951, Continental Screw Co.

GREENLEE AUTOMATICS

6 SPINDLE



4 SPINDLE



Maximum economy of operation on long-run jobs, with an uncluttered, easily-reached tooling area that allows rapid and accurate positioning of tools and attachments . . . permitting precise inspection of work finish and tolerances *on the machine.* The Greenlee "Six" is available in 1″, 1-5/8″, and 2″ capacity — the "Four" in 1-5/8″ and 2-5/8″ capacity.

PRODUCTION MACHINERY

GREENLEE

Automatic News

These free monthly issues are written expressly for those of you who are concerned with various phases of automatic screw machine production. They contain practical and informative articles dealing with tooling and maintenance, generously illustrated with drawings and photographs. If you wish your name added to our mailing list, send your request, on company letterhead, to:

The Editor, *Automatic News*

GREENLEE BROS. & CO.
1752 Mason Ave., Rockford, Illinois

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

Thousands or Millions....

ALUMICAST can produce quality castings in quantity, exactly to your specifications

Let ALUMICAST give you a helping hand with your casting problems. You'll be agreeably surprised with the results if you ask our nationally recognized authorities in research, metallurgy, engineering and production to put their know-how to work for you.

Here at ALUMICAST, we have the most modern laboratory and production equipment to make permanent mold and die castings in aluminum or magnesium. Every step, from ingot to casting, is rigidly regulated. The quality of ALUMICAST castings is outstanding because of expert scientific control. This value, we call "E.S.C.", is of great importance to you. It helps make good products better.

No matter where you are located, you are cordially invited to consult us about your casting requirements for civilian or defense needs. We have sales engineers and representatives in leading cities. If you do not know the name of our man nearest you, write direct to us. ALUMICAST CORPORATION, 1521 N. Kilpatrick Avenue, Chicago 51, Illinois.

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ALUMINUM and MAGNESIUM PERMANENT MOLD and DIE CASTINGS

"E.S.C." EXPERT SCIENTIFIC CONTROL

Ingersoll-Rand ANGLE WRENCHES

get into tight spots with ease

FOR NUT-RUNNING JOBS UP TO ¾" BOLT SIZE! I-R Angle Wrenches are amazingly powerful Air Tools, light in weight for easy handling. These handy air-operated Angle Wrenches are designed solely for fast nut running in confined locations where the use of other types of nut runners is impossible.

720-8

Angle Wrenches Licked This Tough One!

A really mean close-quarter job on an automotive assembly line took its toll of 12 angle wrenches in 1 week's time—An Ingersoll-Rand air powered Size 18L was put on this job and gave uninterrupted production for 3 months.

GET COMPLETE DETAILS
on these compact air angle wrenches promptly from

Ingersoll-Rand

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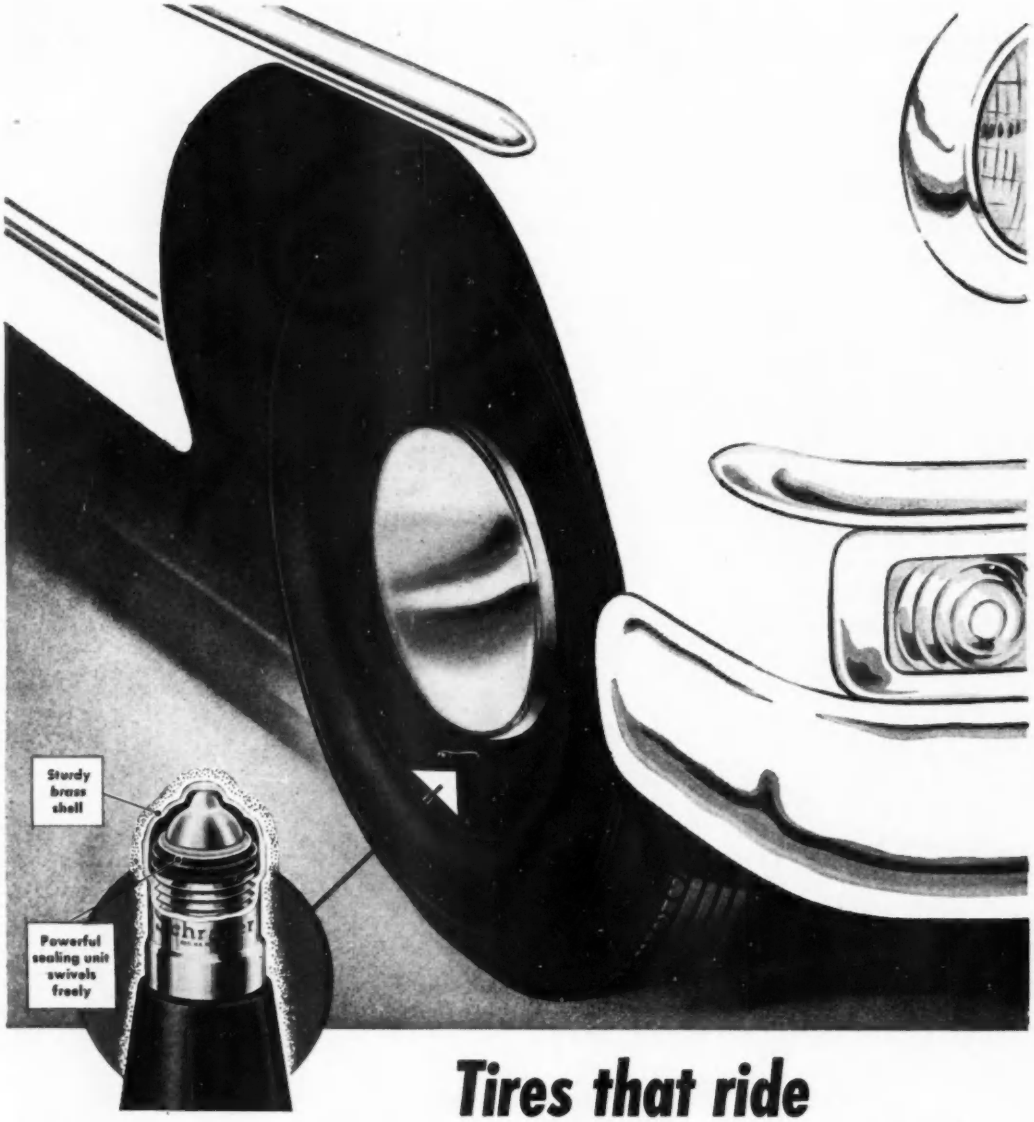
COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS
CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES



Tires that ride to work and play

Load the family in the car. Head for the beach, the country, or town or church . . . with never a fear about the tires. They're built to give protection for many miles of easy, economical driving. A key to dependable tire performance is the valve that *locks* the air in the tire.

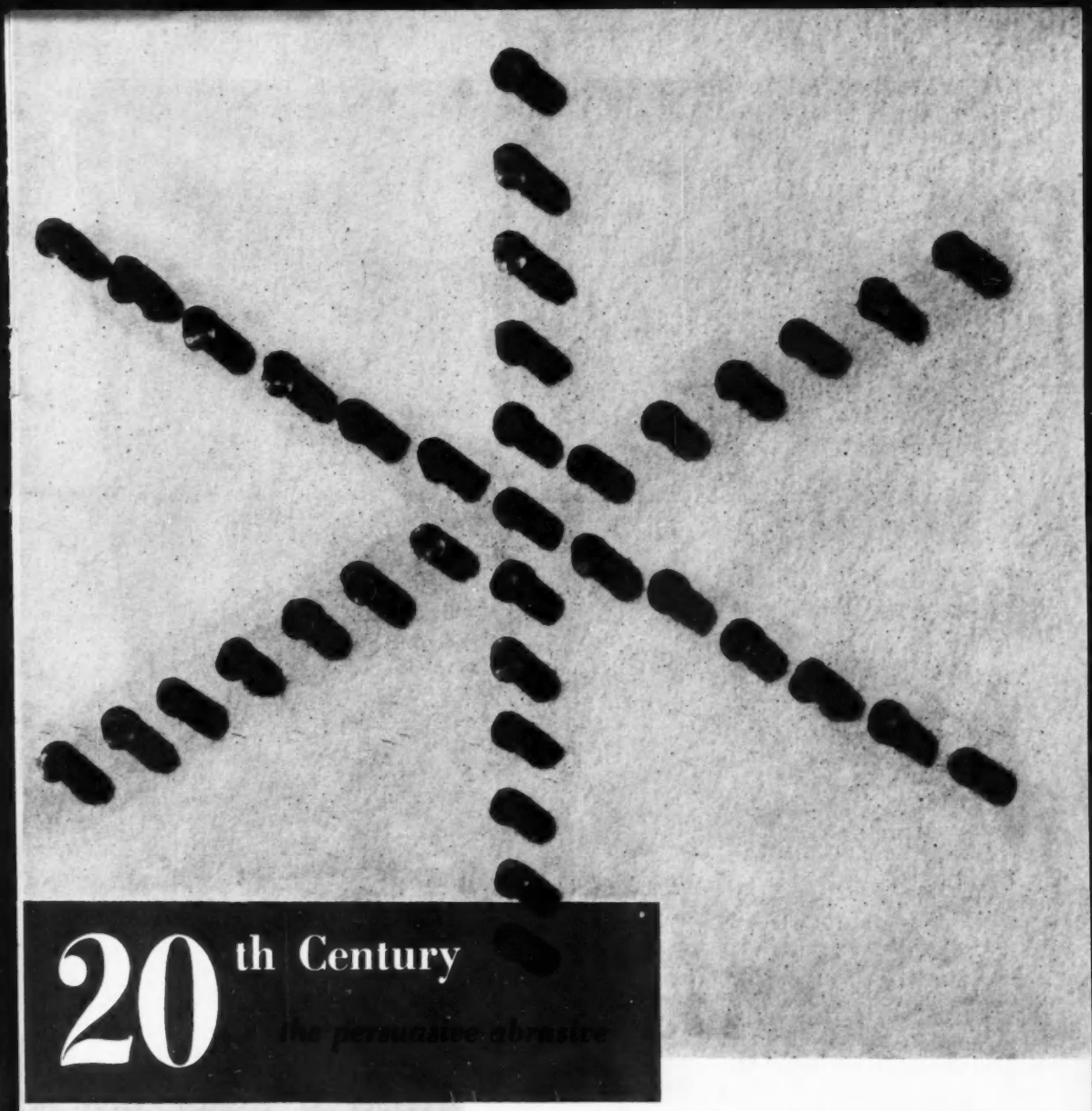
Schrader Tire Valve Caps are designed with the metal outer shell and the specially compounded rubber sealing unit *doubly* reinforced with non-collapsible metal plates. Schrader Valve Caps are *guaranteed* air-tight up to 250 lbs. You can be sure any vehicle, any tire, equipped with Schrader Tire Valves, sealed with these *quality Schrader Caps*, has positive protection at this vital point.

A. SCHRADER'S SON, BROOKLYN 17, N. Y.
Division of Scovill Manufacturing Company, Incorporated

Schrader
REG. U. S. PAT. OFF.

FIRST NAME IN TIRE VALVES

FOR ORIGINAL EQUIPMENT AND REPLACEMENT



20th Century

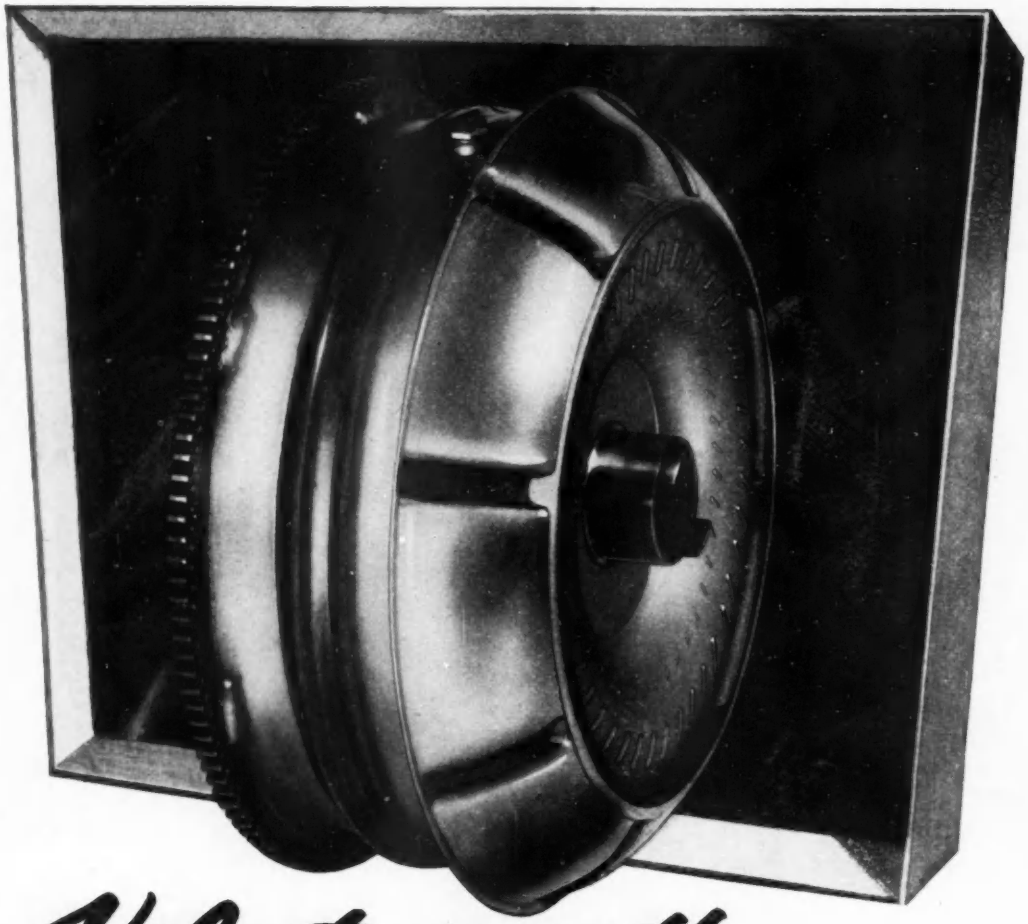
the persuasive abrasive

Any reference to 20th Century Drawn Steel Shot will emphasize its highest quality, economy and ability to stand hard use.

THE CLEVELAND Metal Abrasive CO.

807 East 67th Street Cleveland 8, Ohio
Howell Works: Howell, Michigan

One Of The World's Largest Producers Of Quality Abrasives
Normalized (Copyrighted Trade Name)–Hard Iron–Cut Wire–Powder



Velvet smooth performance

Long torque converters offer the automotive manufacturer important advantages in design, performance and cost.

Power transfer is smooth—*dependably* smooth—torque multiplication of better than 2 to 1 at stall. The converter is direct air-cooled for simplicity and trouble-free service.

Assembly units are fabricated almost entirely from stampings, for low-cost manufacture.

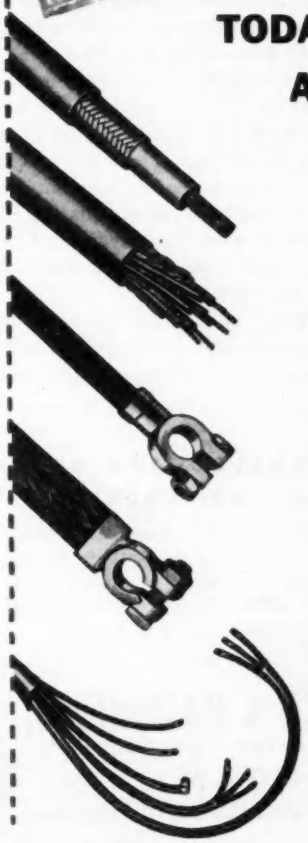
LONG MANUFACTURING DIVISION
Borg-Warner Corporation
DETROIT 12, and WINDSOR, ONT.

ENGINEERING BW PRODUCTION

LONG

CLUTCHES • RADIATORS • TORQUE CONVERTERS
OIL COOLERS

TODAY...WIRE AND CABLE SPECS ARE MORE INVOLVED... MORE IMPORTANT



Crescent engineering collaboration with manufacturers of automobiles, buses, trucks, trailers, aircraft, tractors, industrial and farm power-equipment often has resulted in improved wire and cable specifications, important cost-savings, and higher efficiency in starting, lighting, and ignition systems.

Crescent engineering and manufacturing facilities are *complete*. Wire is drawn to size from copper bars. Insulating compounds designed in our laboratories to meet the most exacting requirements are formulated from natural rubber, synthetic rubber, and the latest plastics. Constant laboratory testing maintains uncompromising quality control right from the start.

We invite you to discuss the advantages of integrating your engineering with ours. No obligation, of course.

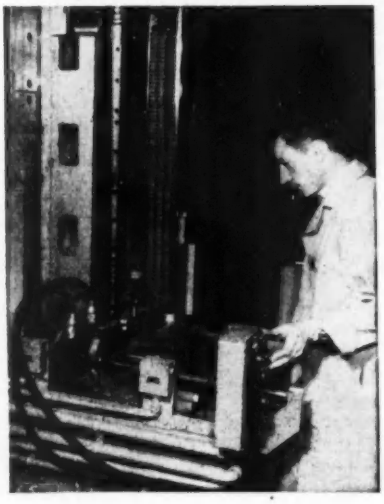
THE CRESCENT COMPANY, INC., PAWTUCKET, RHODE ISLAND

CRESCENT

Wiry Joe

AUTOMOTIVE WIRE AND CABLE

broached in a single pass ... the AMERICAN way



Combining *two* operations on an American SB 48-15 Single Ram Vertical Hydraulic Surface Broaching Machine enabled this automotive engine manufacturer to broach the radius and pad (which are non-adjacent) of the front engine cover *in one pass.*

The tooling for this operation consists of generating type broaches and shaving blades mounted on the main machine slide for broaching the radius and joint surfaces. In addition, a special hardened and ground guide is mounted on the table to guide generating type broaches and shaving blades which are pulled down by adapting the lower end of the holder to the machine slide. These broach the pad thus completing the two operations in one pass.

Automatic clamping, plus an automatic sliding table are two additional features of this American installation that help maintain a production rate of approximately 115 parts per hour at 85% efficiency.

Write for your copy of American's Circular 300.

YOU CAN SOLVE YOUR BROACHING PROBLEMS THE AMERICAN WAY

This is only one of thousands of problems solved during American's 25 years of experience in the manufacture of broaching machines, broaches, and broaching fixtures. A part-print or sample and hourly requirements are all it takes to start American engineers working on your problem. Write today!

AMERICAN *American* BROACH & MACHINE CO.
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See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

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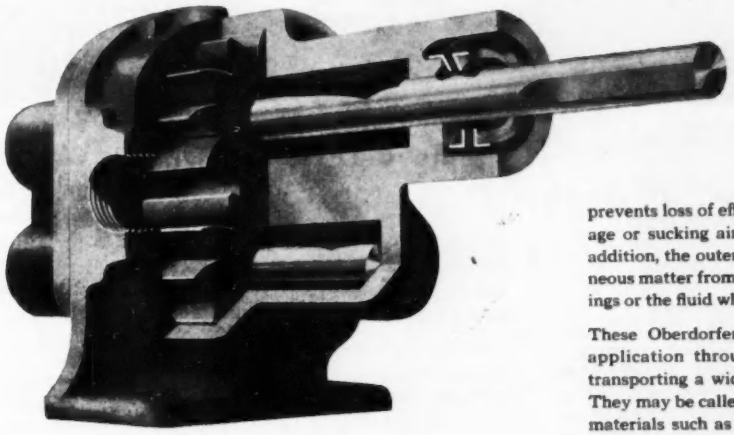

Fig. 1—Cut-away drawing of the Oberdorfer Rotary Gear Pump showing position of National Syntech* Oil Seals.

Syntech* Pressure-Type Oil Seals Increase Efficiency and Life of Rotary Gear Pumps

The minimum contact sealing lip design, common to all National Syntech* Oil Seals, offers many advantages in applications where pressures and corrosive fluids are encountered.

As compared to conventional packing glands:

1. They create less shaft drag.
2. Their Syntech* sealing members are impervious to a greater number of chemicals and corrosive fluids. (Consult our engineers about the fluid involved.)
3. They require less time and skill in installation (less cost) whether in production or in replacement service.
4. Their use simplifies machinery design.

* *Trade Mark Registered*

Fig. 2—National Syntech* 340,000 series springless oil seal.

A case in point is the Oberdorfer Rotary Gear Pump shown in cut-away drawing (Fig. 1). In these pumps a pair of National Syntech* 340,000 series springless oil seals (Fig. 2) are utilized. During the operating cycle the sealing position may be alternately subjected to pressure or vacuum, therefore, the placement of the two seals back to back prevents loss of efficiency through leakage or sucking air into the system. In addition, the outer seal prevents extraneous matter from reaching pump bearings or the fluid which is being handled.

These Oberdorfer Pumps find broad application throughout industry for transporting a wide variety of liquids. They may be called on to handle heavy materials such as molasses or low viscosity oils. Since they are universal in their application, it is important that the seals be dependable under varied circumstances. There are over fifty mechanical parts in these Oberdorfer Pumps and in some cases tolerances are held to .00025 of an inch. Shafts are of stainless steel and are micro-finished which contributes to the efficiency of the oil seals.

Perhaps you have a problem requiring "precision sealing." If so, remember National engineers may have already solved a similar problem and have a stock design oil or fluid seal immediately available for you. It will cost you nothing to investigate.

"Let Your Decision be Based on Precision"

NATIONAL OIL AND FLUID SEALS

NATIONAL MOTOR BEARING CO., INC.

General Offices: Redwood City, California
Plants: Redwood City, Calif.; Downey (Los Angeles County), Calif.; Van Wert Ohio

2280

CALL IN A NATIONAL FIELD ENGINEER

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DOWNEY (Los Angeles Co.), CALIF. . *11634 Patten Rd., Topaz 2-8166*
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NEW YORK CITY, N. Y. . . *122 East 42nd Street, Murray Hill 6-0171*
PHILADELPHIA, PA. . . . *401 North Broad Street, Bell-Walnut 2-6997*
REDWOOD CITY, CALIF. . . *Broadway and National, Emerson 6-3861*
RICHMOND, VA. . . . . *216 South Fifth Street, Richmond 2-5476*
ROCHESTER, N. Y. . . . . *95 Landing Road, North Culver 3531*
WEST SPRINGFIELD, MASS. . . *1025 Elm Street, Springfield 2-1881*
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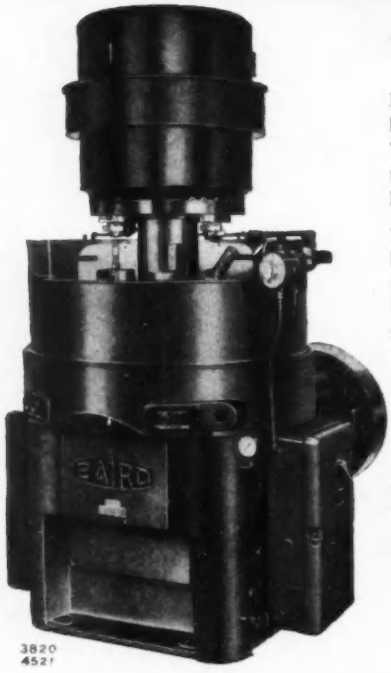
WICHITA, KANSAS . . . . *519 South Broadway, Wichita 2-6971*

ASK BAIRD ABOUT IT!

HIGH PRODUCTION TOOLING



It's AUTOMATIC . . *it's* FAST . . *it's* ACCURATE

FEATURES: Turret (work spindle carrier) turns continuously, grip of holding fixtures automatically releasing for operator to unload and load. Tools move horizontally for facing operations . . . other tools vertically for turning operations. Machine is designed for dry or wet cutting of light jobs, boring piston ends, facing, turning bands, ogives, etc.

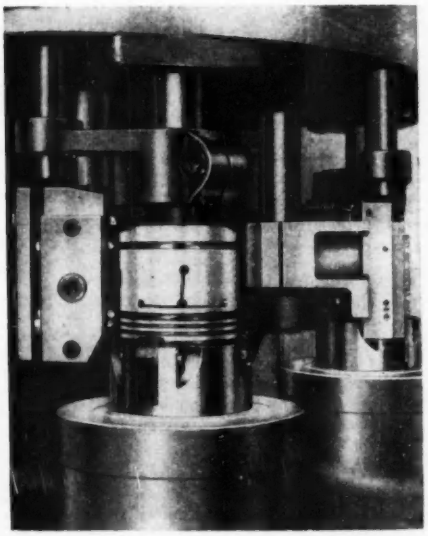
The turret is driven through worm and gears . . . spindles mounted in roller bearing and driven by helical gears. Changes in all speeds are easy . . . inexpensive. Convenient spindle control station at left, control at right for turret and tool arms . . . arranged to prevent feed of tools to work unless spindles are revolving. Both turret and spindles are driven by V belts. Electrical equipment is enclosed, wiring concealed.

Left: Front view, showing splash guards for wet cutting.

Right: A close-up view of typical tooling set-up.

BAIRD 4-SPINDLE VERTICAL CONTINUOUS LATHE

The machine mounts four 5" chucks on a spindle circle of 18". Spindle speeds 240–860 r.p.m. Longitudinal tool stroke 3¼" . . . cross tool stroke 2¾". Feeds .001" to .030" per revolution. Spindle drive 3 to 5 H.P. with push button control; machine drive 1 H.P. Spindle carrier cycle time 12–38 seconds. Production time 3–9 seconds per piece. Cutting time 9–28.5 seconds. Now's the time to "ask Baird about it."



HORIZONTAL AND VERTICAL TOOLING

the BAIRD MACHINE COMPANY

STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

6BA52

"Flying Workhorse" picks up 71% assembly savings...73% weight savings

Piasecki Helicopter Corporation uses Tubular SPEED CLIPS® to make spectacular savings over previous method of attaching blanket insulation

The "flying workhorse" for the Air Force and the Army, Piasecki's new helicopter carries aboard a top-flight example of SPEED NUT savings.

Blanket insulation has to be attached inside the craft in over 700 locations. The old fastening method needed revising to save assembly time and, more important, to save weight. The perfect answer . . . Tubular SPEED CLIPS and standard rivets. *They could take the place of complicated previous methods, and provide an amazing 71% assembly saving, and a total weight savings of 73%!*

Now Tinnerman Tubular Clips, along with hundreds of other SPEED NUTS, are specified for use on all Navy HUP-1 craft and also are used on the new Piasecki H-21 Air Force Assault and Army Transport Helicopter.

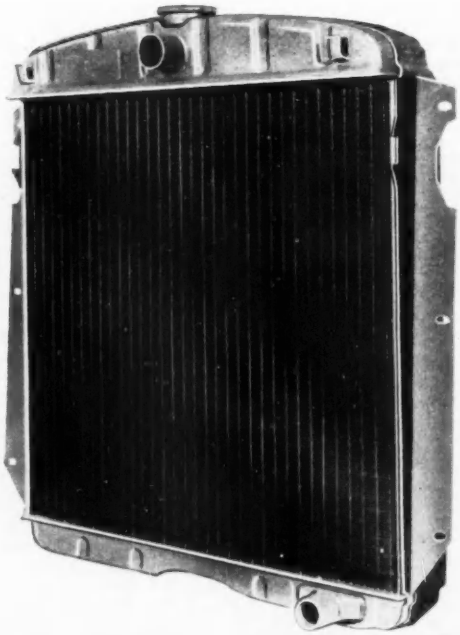
With today's production schedules . . . and budgets . . . it's well worthwhile to *"check the Tinnerman line before you design."* Write for more reasons why, presented in new 24-page booklet "A Story of Quality." TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners Ltd., Hamilton. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales.

OLD METHOD
CLIP
RIVET
NUT
WASHER
INSULATION BLANKET
GLOVE FASTENER STUD
GROMMET BUTTON
SPEED CLIP METHOD
TINNERMAN TUBULAR CLIP C 2733
INSULATION BLANKET
CLEARANCE HOLE
STANDARD RIVET
Drawings at left show obvious SPEED CLIP savings. Old method required complicated clip assembly to be riveted to panel. SPEED CLIP needs only clearance hole in existing panel and rivet to provide vibration-proof attachment.
TINNERMAN

cooling problems?

bring them to...

HARRISON



When Harrison engineers tackle a particular cooling problem, they take into consideration *all* the factors affecting cooling.

Heat rejection, air flow, and coolant circulation are thoroughly investigated, and the results are carefully analyzed before the radiator is selected.

Finally, the entire cooling system is subjected to tests that simulate the severest operating conditions that may be encountered.

The result is a radiator engineered to do a specific job and do it well.

Our engineering and manufacturing facilities are at your disposal. We invite you to make use of them.

HARRISON

HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK

(Advertisement)

U·S·S CARILLOY BORON STEELS PROVE EFFECTIVE IN CONSERVING "CRITICAL" ALLOYS

● Today American industry is faced with the unpleasant fact that, after military needs are met, there is not nearly enough nickel and molybdenum available to produce steels containing these alloys. Actually the alloy shortage is worse now than in World War II.

However, insofar as heat treating steels are concerned, the picture is not as grim as it might be. For in the last war, the potentialities of the element boron for increasing the hardenability of steel became widely recognized and thousands of tons of boron steels were produced by United States Steel and used in military equipment, such as armor, projectiles, torsion springs for tanks, etc.

These and post-war applications of boron steels in large diesel locomotive crankshafts, heavy-duty tractor axles, in wrenches and hand tools, have thoroughly demonstrated boron's ability to replace several hundred times its own weight of other hardening alloys such as nickel, chromium, molybdenum and manganese. Not only have boron steels helped to conserve these critical alloying elements, where they are necessary only for adequate hardenability, but they have effected considerable savings both in the cost of steel and in fabricating costs as well.

U·S·S SuperKore—a pioneer boron steel

More than six years ago, United States Steel Company developed U·S·S SuperKore A, which is essentially a 4312, plus boron and 0.03/0.07% vanadium. Used by a leading aircraft engine builder, this steel (designated as TS 43BV12) has successfully replaced 3310, in heavy-duty gears, shafts and pinions for large air-cooled reciprocating engines and is approved for aircraft use under AMS Spec. 6266. Not only does SuperKore A save one-half the nickel and two-thirds the chromium formerly required but the manufacturer reports improved carburizing characteristics—with less retained austenite and fewer undissolved carbides on direct quenching.

Similarly, U·S·S SuperKore AA—a 4315 plus boron—shows improved hardness near the surface and large tonnages have been used by a leading heavy-duty truck builder who reports that transmission countershafts made from it have been in service for five years with excellent results. Used to replace 4800 types, this steel now designated as TS 43BV14 reduces nickel and molybdenum requirements by one-half.

Another U·S·S SuperKore Steel—SuperKore B—which is a 4615 plus boron, designated TS 46B12, has been successfully used for more than three years to replace 4812, in making a famous line of rock bit cutters, and saves one-half the nickel formerly required.

U·S·S SuperKore C—a 8615 plus boron—originally developed to replace 4300 carburizing grade, and which reduces nickel by one-half and molybdenum by one-fifth has shown good results.

Our work on these alloy-saving carburizing steels has shown that lower alloy steels containing boron will have the same core properties as the higher alloy steels they match in hardenability. In addition to conserving critical alloys they (1) improve hot and cold working, (2) require a shorter annealing cycle, and (3) have improved machinability. All these factors result in fabricating economies.

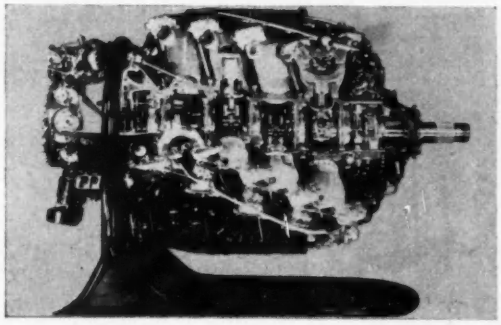
Because in some cases boron steels require more care in their selection and treatment than do the conventional alloy steels, we offer you the assistance of our metallurgists who have pioneered their development and whose practical cooperation will be of material benefit in applying boron steels to your equipment. Simply write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa., Room 2801A.

There are other approaches to the alloy problem

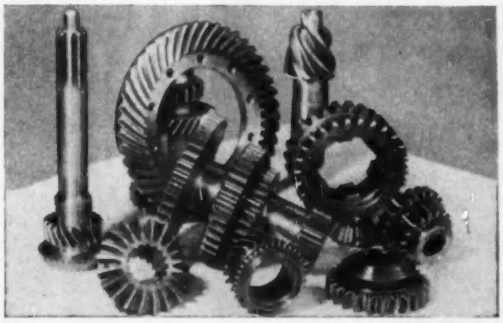
Although the substitution of boron steels for standard alloy grades has enabled many customers to meet their requirements, such substitution is only one of the ways our metallurgists and research specialists are able to solve today's alloy problems.

For example, in some cases, emergency alloys, without boron, have proved entirely satisfactory. In others, improved heat treating procedures have provided adequate hardness and other physical properties in lean standard alloy steels.

In addition to the use of U·S·S SuperKore A in this engine, SuperKore steels are being used in other aircraft power plants.



Heavy-duty truck transmission gears and rear differential gears and pinions such as these are made of U·S·S SuperKore AA.



COLUMBIA-GENEVA STEEL .... TENNESSEE COAL & IRON .... UNITED STATES STEEL SUPPLY, WAREHOUSE DISTRIBUTORS

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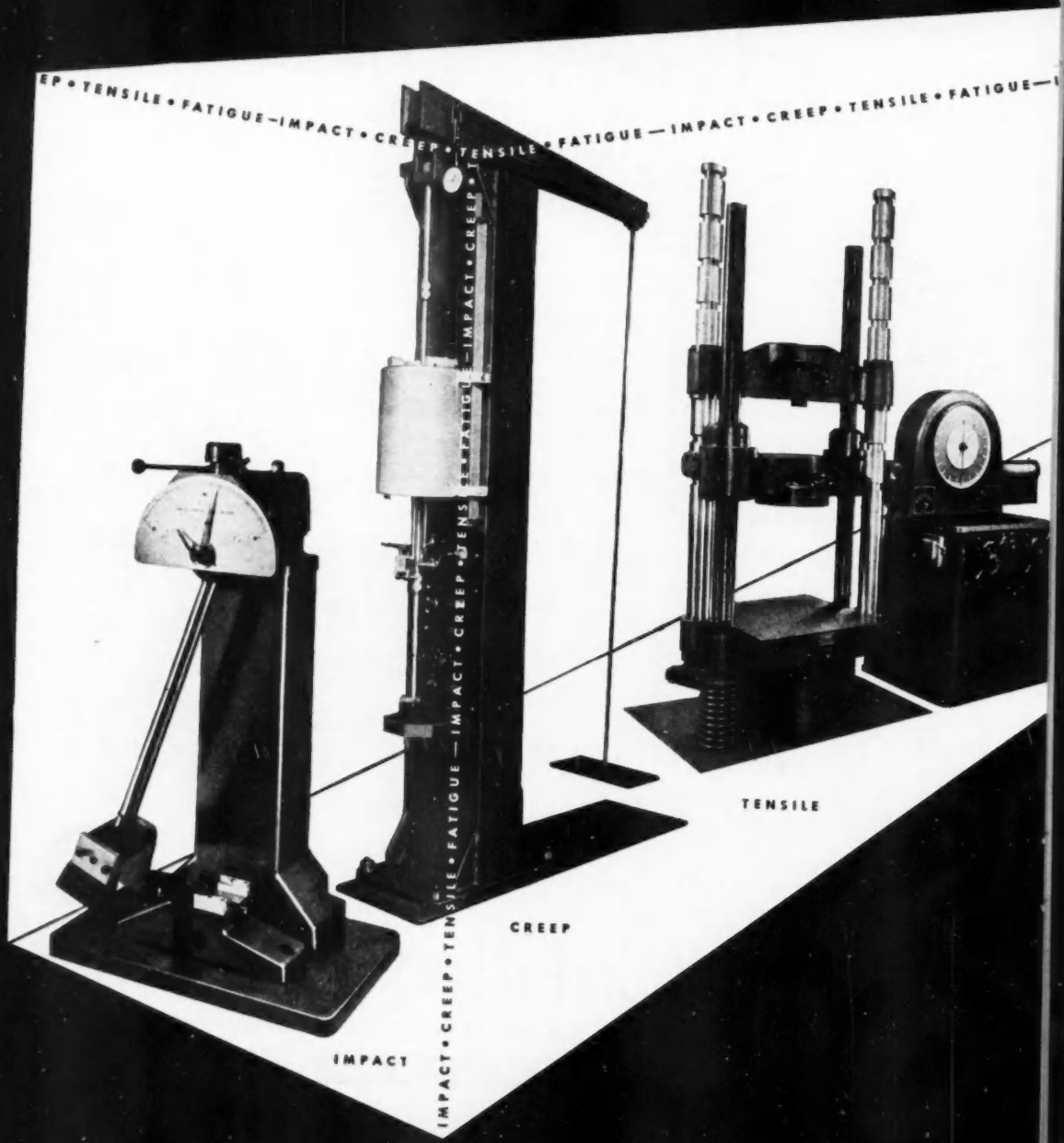
Electric Furnace or Open Hearth · Complete Facilities in Chicago and Pittsburgh

2-415

UNITED STATES STEEL

...*for* LOWEST LOADS - LOW TEMPERATURES - STATIC -



HIGHEST LOADS
HIGH TEMPERATURES
DYNAMIC

IMPACT • CREEP • TENSILE • FATIGUE

FATIGUE

BALDWIN

Basic Testing Package

BALDWIN-LIMA-HAMILTON

Philadelphia 42, Pa. *Offices in Principal Cities*
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5 groups of specialists in research, development and manufacture of better testing equipment

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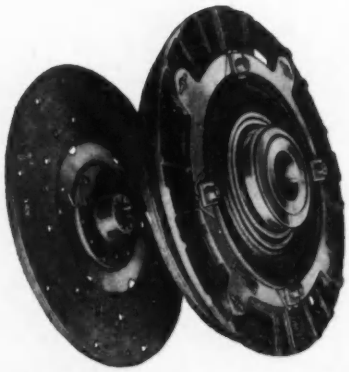
Lipe CLUTCHES can take it!

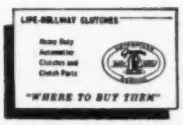
Even with the heaviest loads, Lipe Clutches never need babying. Their friction surfaces always come together squarely, smoothly—hold in final engagement without slipping. There's no grab . . . no shock . . . no jerk. That means far longer clutch life—far fewer lay-ups for repairs.



Lipe Clutches reduce "down time" BECAUSE . . .

There's only one pressure spring, instead of a dozen or more springs of unequal weight. The pressure of this single spring is evenly distributed all around the plate by 20 pressure levers. Pressure plate never cocks—facing wears evenly without spot burning. Result: *more engagements between teardowns!*

Write for free Service Manual. For quick service on genuine Lipe parts, look for this ad in the yellow pages of telephone directories in principal cities.

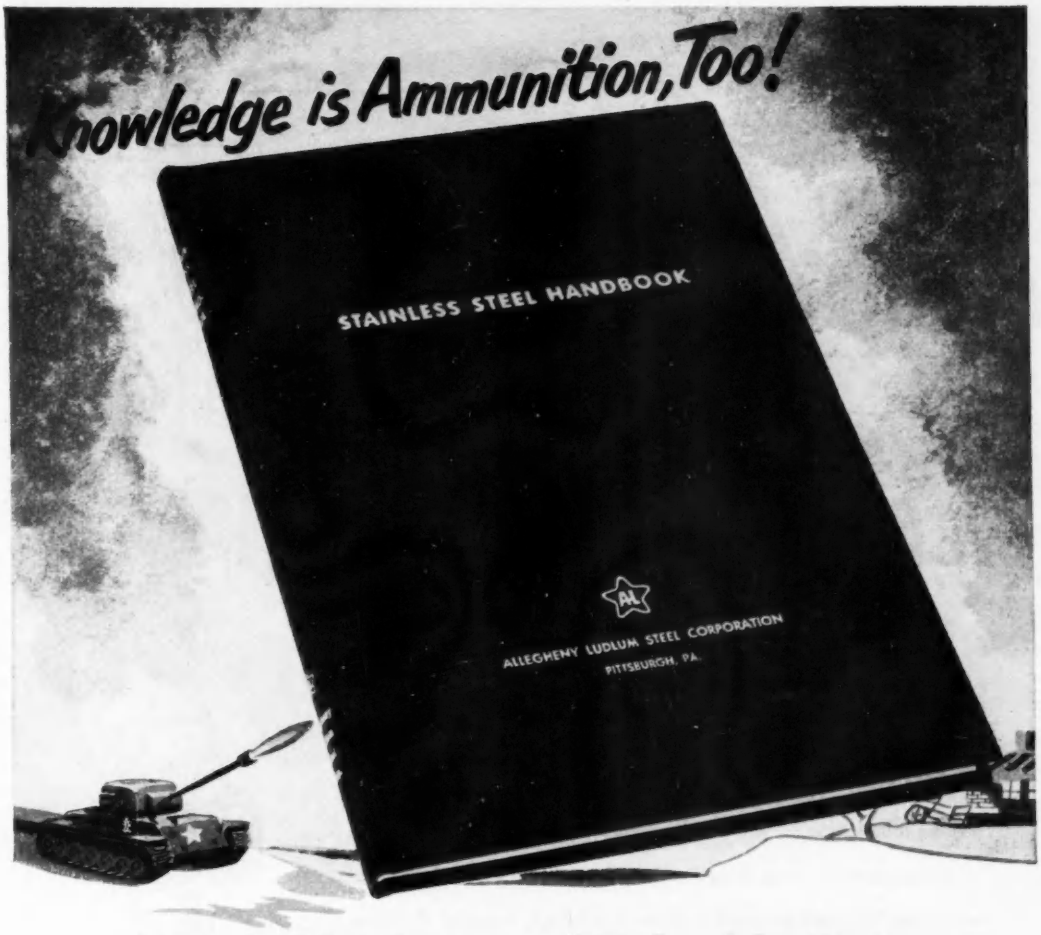


LIPE ROLLWAY

Lipe - ROLLWAY CORPORATION

Manufacturers of Automotive Clutches and Machine Tools

Syracuse 1, N. Y.



Here's 124 Pages of Valuable Data on STAINLESS STEEL

Stainless steel is a critical rearmament material. As the nation's mobilization program shifts into higher speed, supplies of this vital alloy are becoming increasingly restricted. If you're using stainless, be sure you make every pound go as far as possible.

Allegheny Ludlum's new 124-page, case-bound Stainless Steel Handbook is ready for distribution now. It will help you to select the right stainless steel and to use it right. Comprehensive listings of analysis, properties and characteristics of each type will guide you in specifying grades that will do your job most efficiently. Clear, concise fabrication data will help you speed production and cut waste.

Your copy of the Stainless Steel Handbook will be sent—*without charge*—upon request. Our only stipulation: please make your request upon your company letterhead. ● Write Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

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W&D 3947

Remember this also
America must have more Scrap to make more Steel!
Get in the Scrap Now!

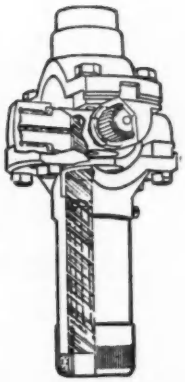
You can make it **BETTER** with

Allegheny Metal

AL
TIME-TESTED STAINLESS STEEL

if LUBRICATION is your problem

MECHANICS joints are designed to permit generous, long-lasting lubrication — without disassembling. One "shot", through a convenient oil plug hole in the cross, fills the reservoir from which the lubricant is forced to all four bearings, equally. Another "shot" fills the slip-yoke chamber. Thoroughly efficient seals prevent leakage and keep out dirt and moisture.



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Check the advantages of melting and remelting quality steel

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Several TOCCO melting furnaces may be operated from one TOCCO high-frequency power source.

Some Users of TOCCO High-Frequency Melting Furnaces

American Electro Metal Corp.
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If any of these advantages suggest economies in your operations write us for full details—no obligation, of course.

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Hardening • Brazing
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ALCOA -your first source for ALUMINUM CASTINGS

- Four modern foundries, two die casting plants—strategically located from coast to coast.
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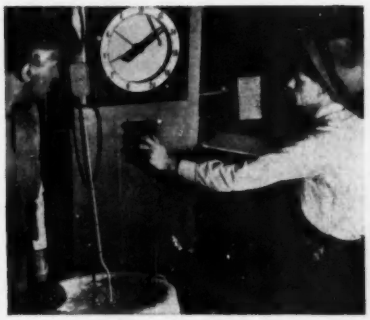
- 41 years in the casting business, 30 years in the die casting business, 64 years of aluminum experience.
- Design and development help backed by the world's greatest aluminum research facilities.

"SEE IT NOW," with Edward R. Murrow, brings the world to your armchair...CBS-TV every Sunday--5:30 P.M. EST

Facilities like these mean satisfaction with your source of supply—

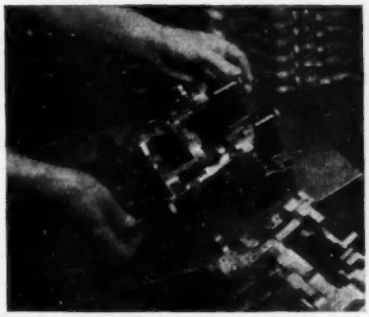
CORE MAKING—fast, high quality production of cores is assured by Alcoa's modern sand handling equipment and large capacity core ovens.



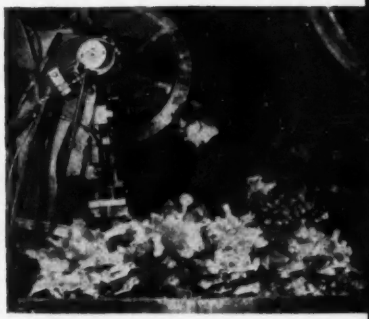
POURING TEMPERATURES—are constantly checked and recorded at control stations on all foundry floors. Procedure like this and continuous alloy control guarantee highest quality aluminum castings and die castings.

HIGH PRODUCTION CAPACITY—of Alcoa's die casting plants is partially represented in this row of cold chamber machines at Alcoa's Chicago die casting plant.

PERMANENT MOLD CASTING—formerly considered for small parts only. Today permanent mold castings weighing up to 500 pounds are not unusual.



INSPECTION—of every part is standard practice in Alcoa plants. Dimensional checks, as shown here, or visual inspection by trained personnel reduces costly rejects. Metallurgical checks further guard the castings' quality.



FINISHING—many secondary machining operations are performed by Alcoa foundries and die casting plants. Machining, grinding, sand blasting, and ball burnishing are but a few.

Ask **ALCOA** *first whatever your need in Aluminum*

While the sale of our products is presently controlled by government regulations, you'll find no limitations on help in design, application or fabrication. Your local Alcoa sales engineer and your local Alcoa distributor are headquarters for "everything" in aluminum. They will cooperate to the fullest in helping you get the metal you need. They are listed under "aluminum" in your classified phone book.

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1903B Gulf Building, Pittsburgh 19, Pa.

SHEET, PLATE, FOIL

TUBE, PIPE AND PIPE FITTINGS

ELECTRICAL CONDUCTOR

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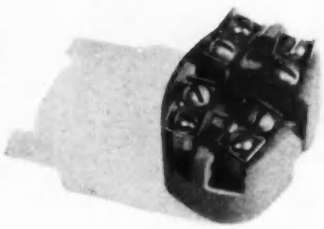
ALCOA *first in* ALUMINUM

ALUMINUM COMPANY OF AMERICA

NEW screw type thermocouple head

New screw type thermocouple head with cover removed, showing single terminal block. Interchangeable duplex terminal block shown below.



. . . now available through your

HSM
HONEYWELL SUPPLIES MAN

Here's a new Brown Screw Type Thermocouple Head that *cannot rust or freeze* . . . another plus value in the HSM Plan for convenient and economical purchasing of pyrometer supplies.

This unit effectively safeguards terminal connections from corrosive effects of high temperatures and extreme weather conditions.

Versatile: it accommodates single and duplex thermocouple, and resistance thermometer, terminal blocks . . . is interchangeable with other heads . . . and permits installation of twin thermocouples with a single head. Thus, your inventory of thermocouple heads is materially reduced.

Threads on the inside of the head . . . plus plating and enameling *after* machining . . . prevent freezing and rusting.

Call your local Honeywell Supplies Man for prices and delivery information, and for details on the HSM Plan for all your pyrometer supplies purchases . . . he is as near as your phone.

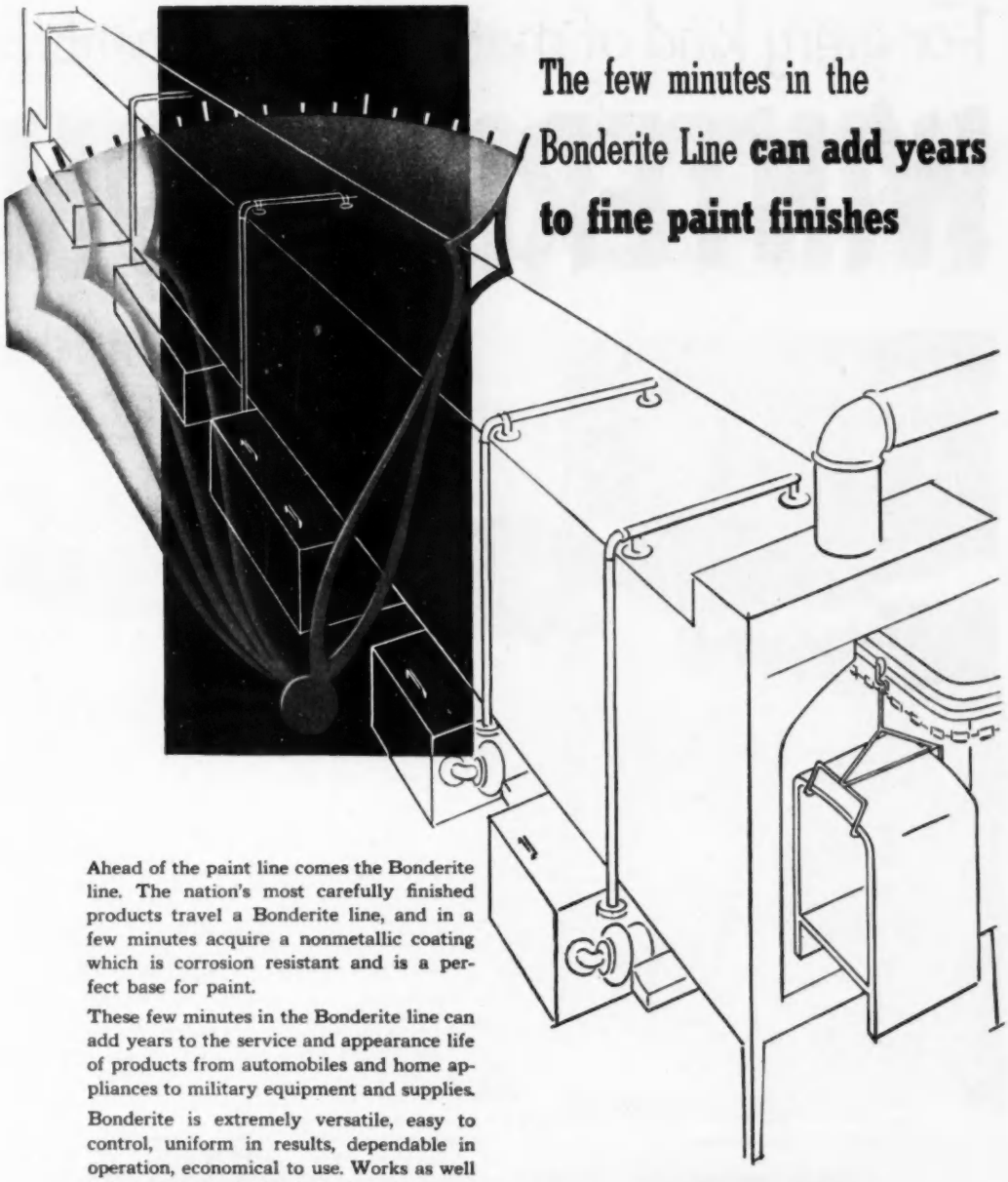
MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4548 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS

First in Controls

● *Important Reference Data*

Write for a copy of New Pyrometer Supplies Buyers' Guide, No. 100-4



The few minutes in the Bonderite Line **can add years to fine paint finishes**

Ahead of the paint line comes the Bonderite line. The nation's most carefully finished products travel a Bonderite line, and in a few minutes acquire a nonmetallic coating which is corrosion resistant and is a perfect base for paint.

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Bonderite is extremely versatile, easy to control, uniform in results, dependable in operation, economical to use. Works as well in immersion tanks for limited production as on the largest mass production lines.

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**Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.*

BONDERITE—corrosion resistant paint base

BONDERITE and BONDERLUBE—aids in cold forming of metals

PARCO COMPOUND—rust resistant

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For every kind of motorized equipment...

WINTERIZATION

From Alaska to Korea civilian and military vehicles and equipment are winterized by Perfection

This Army tank uses Perfection Winterization equipment to operate at any temperature.

Army 2½ ton truck with Perfection Engine Heater

here's why Perfection is

HEADQUARTERS

PERFECTION WINTERIZATION

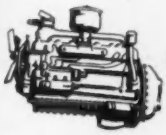
MAKES ENGINES GO AT 65 BELOW

✓Warms battery-more power for starting
✓Heats internal engine parts
✓Warms oil-keeps it fluid
✓Heats cab-warms personnel

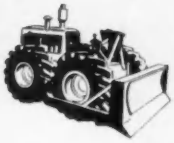
Perfection's Engineering Department is staffed and equipped to handle *any* winterization problem you may have—civilian or military. We can help you meet the Government Specifications that your defense contracts call for.

COLD ROOM FACILITIES are available for system development and military specification performance testing. Write, call or wire for one of our sales engineers to discuss your problems with you. Perfection Stove Company, 7376-A Platt Ave., Cleveland 4, Ohio.

Over 100,000 installations
Over 15 years' experience


DIESEL ENGINES

COMPRESSORS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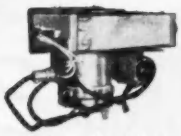
HEATERS FOR EVERY TYPE OF PROBLEM

Heaters
Direct-Fired-Air Systems
Fresh Air Systems
Liquid-Coolant Systems

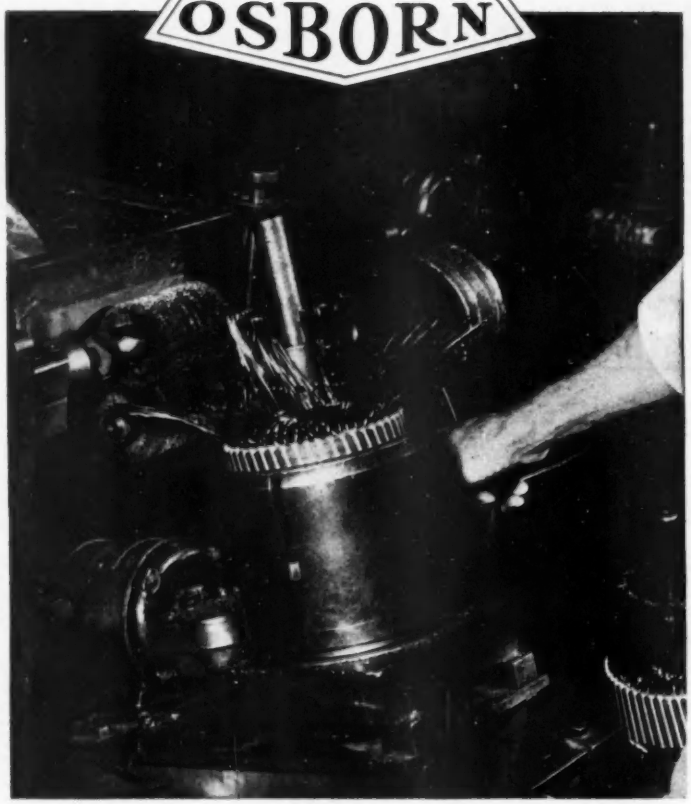
Typical example of a Perfection Engine Heater (Coolant type)

One of many Perfection Engine Heaters (Fresh Air type)

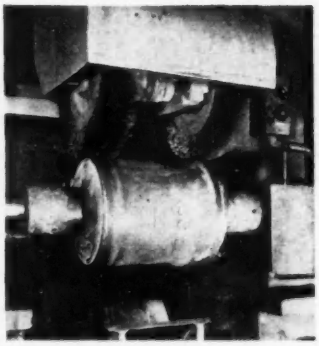

A Perfection Direct-Fired Air Heater

Another Perfection Heater (Coolant Type)

OSBORN



OFF COMES RUST. These two counter-rotating Osborn Master® Wire Wheel Brushes, powered by 1½ h.p. motors, clean rust and scale from 2-inch pipe preparatory to fabrication. Cleans 15-feet of pipe per minute . . . at the push of a button.



OFF COMES SLAG. It takes only 40 seconds for these Osborn Wire Wheel Brushes to whisk away all slag and scale from both end welds of compressor heads . . . at the push of a button.

How to make parts come clean . . . at the push of a button

It takes only 8 seconds to remove the enamel insulation from the entire bunch of a motor's coil leads with the set-up shown above. This stripping, preparatory to soldering, is done with Osborn power brushing . . . automatically . . . at the push of a button.

Wire stripping is typical of thousands of cleaning operations throughout Industry which have been simplified and speeded by Osborn Power Brushes. Your **O**sborn **B**rushing **A**nalyst is experienced in finding solutions to cleaning and finishing problems of all kinds.

His service is backed by the extensive engineering facilities of Osborn, to devise brushing methods and special machines *to help you.* There is no obligation. Call today or write *The Osborn Manufacturing Company, Dept. 619, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

OFF COMES FLASH. Removal of rubber flash of rubber-to-steel joints of army tank track shoes is simply a matter of sliding the shoes across the face of an Osborn Disc-Center* Wire Wheel Brush. A mass production operation . . . at the push of a button.

*Trademark

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

USE FLEXLOC

SELF-LOCKING NUTS

The blades of the Scythette operate at 1,400 oscillations per minute at maximum speed. The tolerance of the blade clearance is .012" +.000", —.003". Both are good reasons why FLEXLOC Nuts are used on this power scythe.

Scythette uses them to provide *vibration insurance* against the loosening of the high speed, double-oscillating cutter bar. The four ¼-20 FLEXLOC Nuts positively stay tight under extreme vibration, maintain the proper cutting tension, reduce maintenance.

Perhaps you have a similar vibration problem. Let us help you solve it with FLEXLOC Self-Locking Nuts. Although the Government has pre-empted almost all of our FLEXLOC output, we'll be glad to supply samples. Just let us know the size you need. STANDARD PRESSED STEEL CO., Jenkintown 53, Pennsylvania.

FLEXLOC®

FLEXLOC LOCKNUT DIVISION

SPS

JENKINTOWN PENNSYLVANIA

Repeat performance...with a new twist!

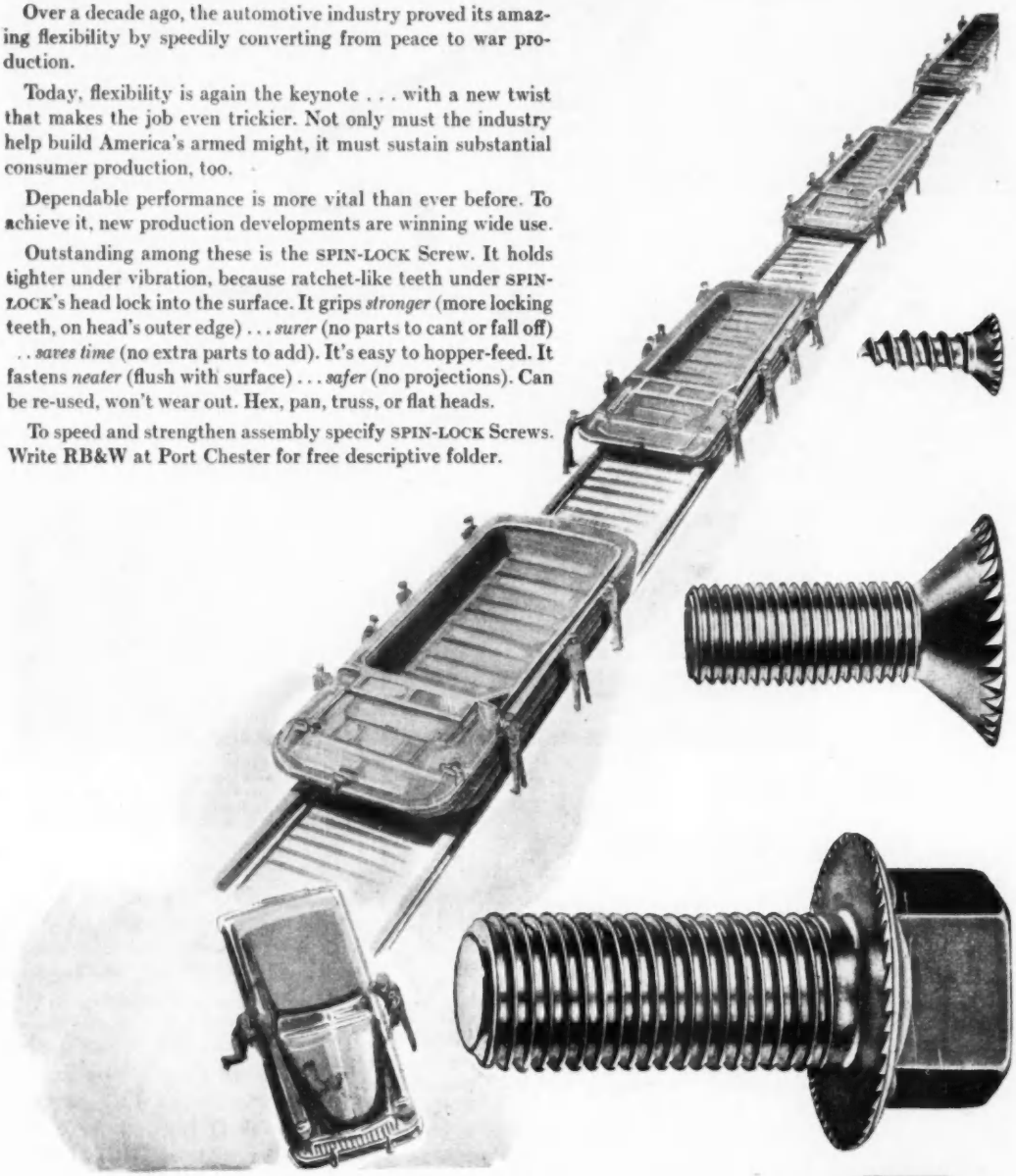
Over a decade ago, the automotive industry proved its amazing flexibility by speedily converting from peace to war production.

Today, flexibility is again the keynote . . . with a new twist that makes the job even trickier. Not only must the industry help build America's armed might, it must sustain substantial consumer production, too.

Dependable performance is more vital than ever before. To achieve it, new production developments are winning wide use.

Outstanding among these is the SPIN-LOCK Screw. It holds tighter under vibration, because ratchet-like teeth under SPIN-LOCK's head lock into the surface. It grips *stronger* (more locking teeth, on head's outer edge) . . . *surer* (no parts to cant or fall off) . . *saves time* (no extra parts to add). It's easy to hopper-feed. It fastens *neater* (flush with surface) . . . *safer* (no projections). Can be re-used, won't wear out. Hex, pan, truss, or flat heads.

To speed and strengthen assembly specify SPIN-LOCK Screws. Write RB&W at Port Chester for free descriptive folder.



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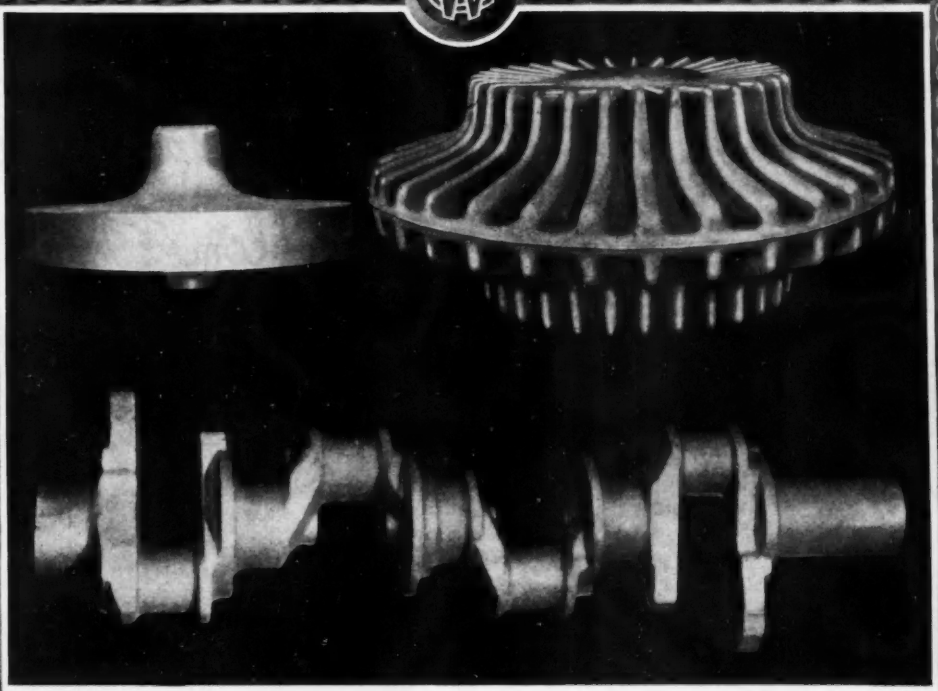
RB&W
THE COMPLETE QUALITY LINE

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Dallas, Oakland. Sales agents at: Portland, Seattle.

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG



Wyman-Gordon — specialists in the vital forgings of the internal combustion engine since its inception — is today the largest producer of crankshafts for the automotive industry and of all types of forgings for the aircraft industry. Be it crankshafts and other vital forgings for the piston type engines or turbine wheels and impellers for turbo jets — there is no substitute for Wyman-Gordon experience.

Standard of the Industry for More Than Sixty Years

WYMAN-GORDON

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL

WORCESTER, MASSACHUSETTS

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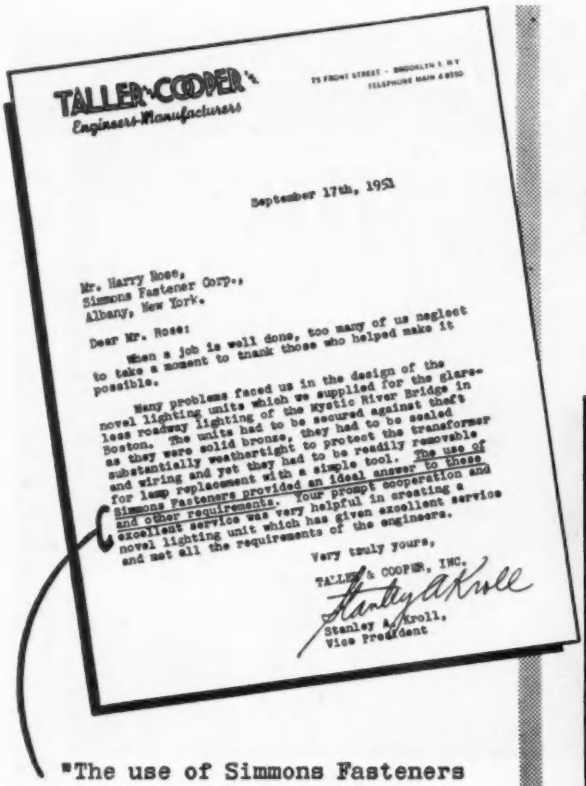


TALLER & COOPER
Engineers-Manufacturers

75 FRONT STREET · BROOKLYN 1, N.Y.
TELEPHONE MAIN 4-8910

September 17th, 1951

Mr. Harry Rose,
Simmons Fastener Corp.,
Albany, New York.

Dear Mr. Rose:

When a job is well done, too many of us neglect to take a moment to thank those who helped make it possible.

Many problems faced us in the design of the novel lighting units which we supplied for the glare-less roadway lighting of the Mystic River Bridge in Boston. The units had to be secured against theft as they were solid bronze, they had to be sealed substantially weathertight to protect the transformer and wiring and yet they had to be readily removable for lamp replacement with a simple tool. The use of Simmons Fasteners provided an ideal answer to these and other requirements. Your prompt cooperation and excellent service was very helpful in creating a novel lighting unit which has given excellent service and met all the requirements of the engineers.

Very truly yours,

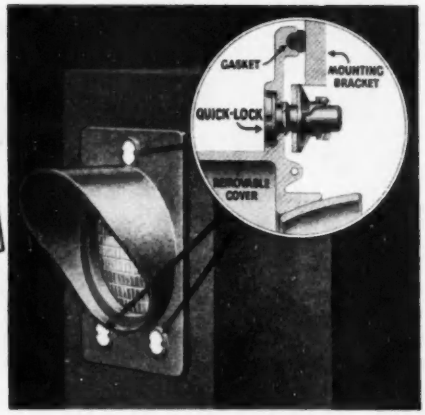
TALLER & COOPER, INC.

Stanley A. Kroll,
Vice President

"The use of Simmons Fasteners provided an ideal answer"

Getting the *right* answer—engineering and production-wise—is the day-by-day business of Taller & Cooper, Inc. This engineering and manufacturing company has produced many unusual designs for power control, wind tunnels, computers, automatic weighing and toll-bridge structures. Taller & Cooper engineers, in developing the sealed-beam lighting for the Mystic River Bridge, Boston, Mass., found the right answer in Simmons QUICK-LOCK.

Have you a similar fastening problem?



Unusual design by Taller & Cooper solves a number of problems in highway lighting. The engineers use a conventional sealed-beam headlamp mounted in an adjustable bracket. A cast bronze cover plate with integral visor is attached with three Simmons QUICK-LOCK fasteners to the housing which is part of the bridge structure. A rubber gasket seals the assembly.

Servicing is simple because QUICK-LOCK opens or locks with a 90-deg. turn. Inspection is easy because the stud is self-ejecting when it isn't locked. QUICK-LOCK keeps the gasket compressed tightly. The special head makes the unit tamper-proof. The fastener also resists vibration.

QUICK-LOCK can provide your design with unusual plusses, too. Simmons' engineers will be glad to study your fastening problems.

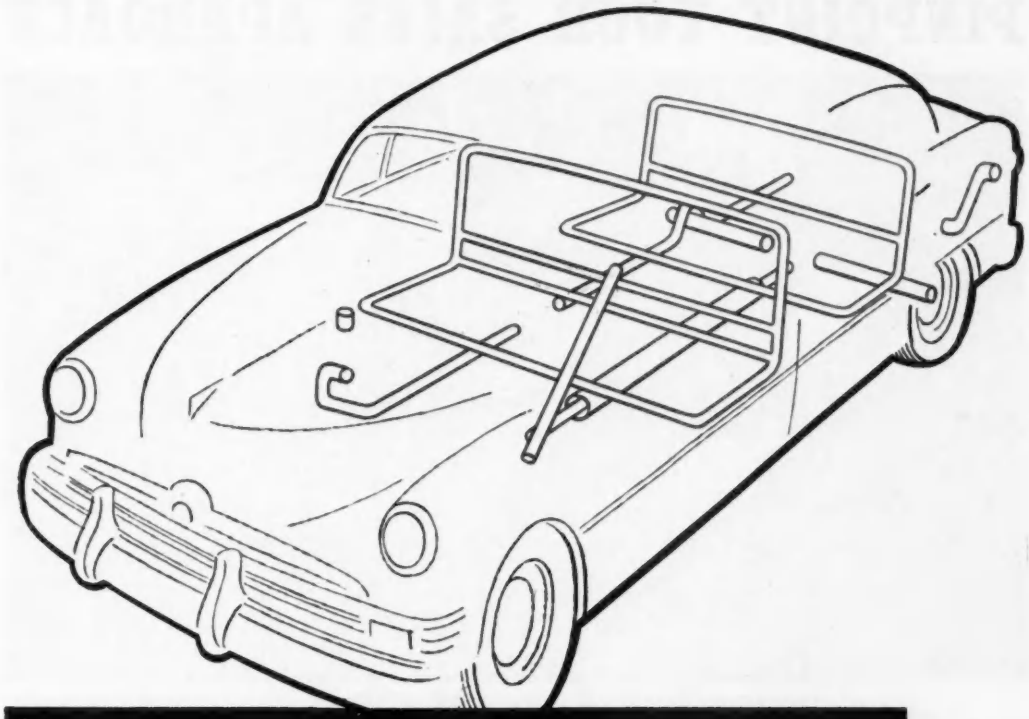
SIMMONS FASTENER CORPORATION
1749 North Broadway, Albany 1, New York

Simmons

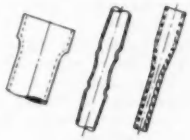
LINK-LOCK . . . QUICK-LOCK . . . SPRING-LOCK . . . ROTO-LOCK

FASTENERS WITH USES UNLIMITED

another job for Brainard ELECTRIC-WELDED TUBING



MASS PRODUCTION PARTS FOR THE HIGHWAY



EASY TO FABRICATE

Brainard tubing is a uniform product made to close tolerances. Has good machining qualities and finish can be supplied as specified. Easily fabricated—can be beaded, expanded, swaged, spun, flanged, upset, grooved, fluted, flattened, tapered, and otherwise formed. Supplied straight or fabricated, sizes ½" to 4" O.D.; .025 to .180 gage.

Expanded production at Brainard's new tube mill permits fast delivery on certain sizes of electric-welded steel tubing. Send coupon for immediate information.

● Go no further than your own car to find the wide application of Brainard Electric-welded steel tubing.

The automotive industry fabricates Brainard tubing in a hundred shapes. For hard-working parts—propeller shafts, torque tubes, steering columns. For structural members—tubular seat frames, rear axle housings. For air, gasoline, and exhaust lines.

Brainard's integrated production facilities assure quality control throughout manufacture . . . from ore to finished tubing. You can depend on Brainard service for *your* needs. District offices in principal cities throughout the U. S.

Write for Full Information →

Brainard
SHAWMUTSTEEL
STEEL DIVISION
SHARON STEEL CORPORATION
WARREN, OHIO

Brainard Steel Division, Dept. W-2
Griswold Street, Warren, Ohio

☐ Send catalog listing complete specifications of Brainard Tubing.

☐ Advise availability of following sizes:_____

Your Name_____

Company_____

Address_____

City_____ State_____

County by County . . . City by City

PINPOINT YOUR SALES APPROACH

POLK MARKET VALUATION INDEX

Every pinpoint on a map . . . every sales area . . . can be accurately measured in the automotive industry because actual sales statistics are available. No other industry can gauge market potentials . . . establish sales quotas . . . determine advertising so accurately . . . or merchandise its products as efficiently because actual car and truck registration statistics are available—and compiled for you.

Now, to this invaluable registration information Polk has added a new service . . . has devised a new labor saving method of using such information. On specially printed forms it is now possible to obtain:

— number of cars and trucks in operation as of December 31, 1951.
— for each urban post office town; arranged by county and state.
— printed on 8½ x 11" sales-control worksheets with column headings under which you can post your own sales figures, expenditures, and potentials . . . comparing it instantly with basic registration facts about the size of each market.

Learn the complete story of this new Polk service that makes fuller use of car and truck registration statistics. Let us tell you how it can fit into your sales picture.

★ ★ ★ ★ ★ ***Serving the Automotive Industry and its Dealers Since 1923*** ★ ★ ★ ★ ★

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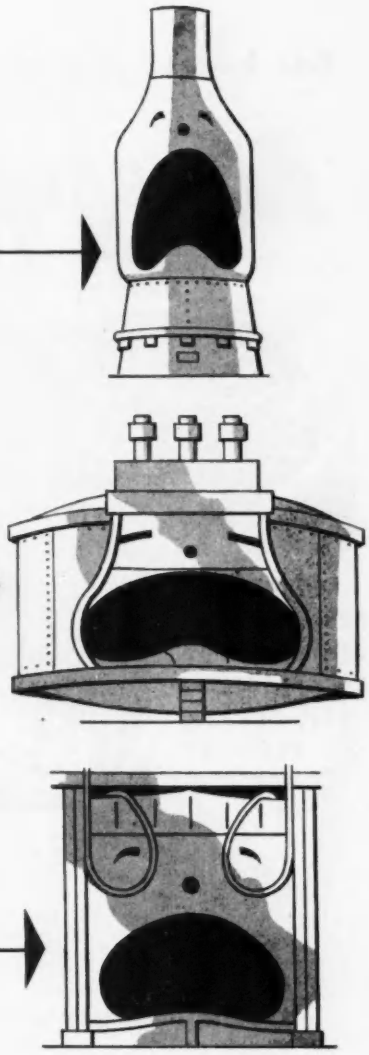
BRANCHES: New York • Chicago • Philadelphia • Cleveland • St. Louis • Cincinnati

ALSO Planned Direct Mail Promotions . . . Consumer Research . . . City Directories . . . Automotive Statistics . . . Polk Bankers' Encyclopedia . . . Mailing Lists . . . Contest Management

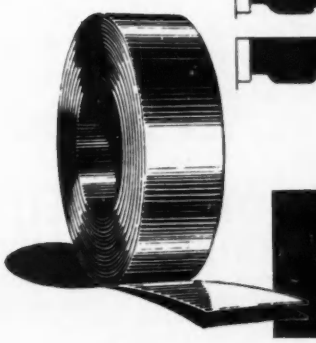
Help feed these hungry mouths!



The steel industry NEEDS your scrap to help supply YOUR needs in STEEL

ROOT OUT THE SCRAP TODAY

ROUTE IT ON ITS WAY!



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CORPORATION
CARNEGIE, PENNSYLVANIA

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Markem machines, types, and inks constitute a better method for marking the products of industry. Markem equipment is engineered to solve special marking problems. Behind the Markem method lies nearly half a century of marking experience which may be applied to your marking problem.

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There is a Markem marking machine for practically every marking purpose — for *direct marking* of product packages, products, and product parts — for *imprinting* labels, tags, tapes, and special gummed, pressure-sensitive or heat-seal backed material, or for producing *complete labels*. Makes up to many thousand durable imprints per hour on almost any kind of material. No special skill needed to operate. Legend and color of imprint quickly and easily changed.

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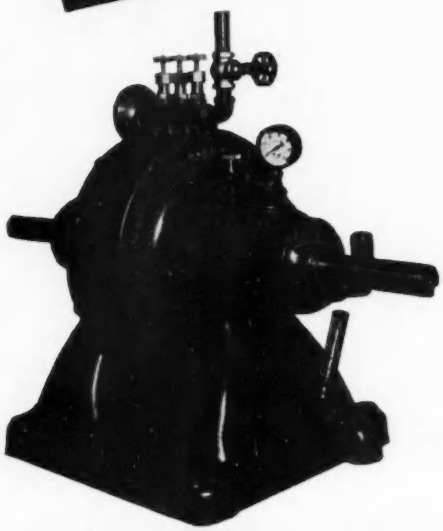
MARKEM BETTER MARKING SINCE 1911

HI-EFF TAYLOR HYDRAULIC DYNAMOMETERS



EFFICIENT — ECONOMICAL — COMPACT

Investigate today! Taylor HI-EFF now offers a unidirectional force measurement device, if remote station reading is desired. In addition, remote control can be employed in most applications.

All frictional and torque losses, except of cradle bearings, are measured. Consequently a high degree of accuracy (approx. 99.7%) is maintained. Compared on a H.P. and R.P.M. capacity basis, and considering the low initial cost, minimum maintenance expense and small floor space required, you can have HI-EFF accuracy at cost savings that will surprise you. HI-EFF offers the most economical maintenance and investment cost per hour.

Taylor HI-EFF Hydraulic Dynamometers are available in 72 different capacity models — Capacities range from fractional to 10,000 H.P. Speeds from 0 to 25,000 R.P.M. Reversible if desired.

Taylor engineers will be glad to make recommendations to suit your specific problems. Write for Bulletin No. 760.

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Manufacturers of HI-EFF Hydraulic Dynamometers — Static Balancing Machines — Sensitive Drilling Machines.

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FULL-FLOW
SELF CLEANING
FULLY AUTOMATIC

COOLANT FILTERS

• A gravity filter, for soluble oils and cutting oils, complete and continuous filtration of the coolant removes heat-bearing solids as it comes from the work. Lower coolant temperature and a clean wheel assure more uniform limits, better finish and greater accuracy. Proper coolant filtration eliminates scruff, prevents attrition in grinding operations, and lowers rejections. Less wheel dressing is required, saves valuable diamond dressing tools, lengthens wheel life. Speed your production with Delpark Coolant Filters by extending coolant life, eliminating down time for cleaning reservoir.

Write For More Complete Information

- **LONGER WHEEL LIFE**
- **UNIFORM COOLANT TEMPERATURE**
- **LOWER REJECTIONS**
- **NO DOWN TIME FOR DESLUDGING RESERVOIR**

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INDUSTRIAL FILTRATION

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BY THE COMPANIES IT SERVES
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for over a quarter-century
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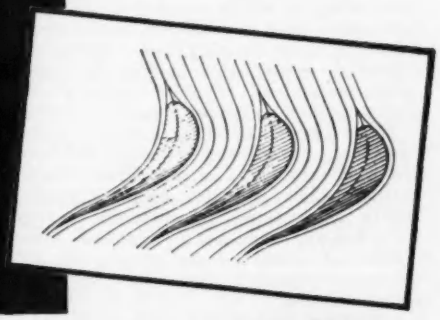
DISTINGUISHED FOR SIMPLICITY AND GREATER EFFICIENCY



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Pioneers of torque converters in America, Schneider today is producing dependable hydraulic torque converters that are characterized by their simplicity and economy. These units are used in busses, trucks, tractors, and industrial application.

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Pioneers of Torque Converters in America

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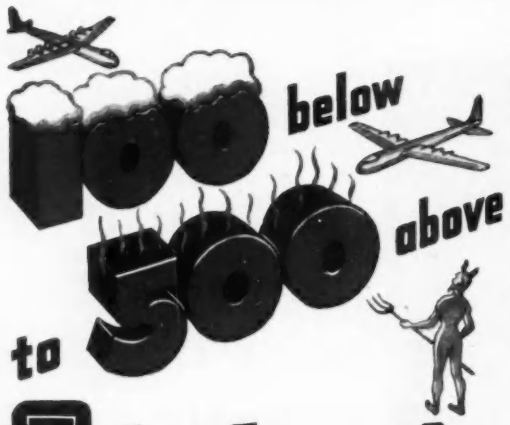

Cohrlastic

silicone coated fabrics

The makers of Cohrlastic products, for the first time, bring to designers and engineers, a comprehensive series of silicone rubber-coated fabrics for temperatures ranging from —100 to +500°F. Operating in the upper and lower limits, most synthetics and all natural rubbers crack and shatter or melt and disintegrate.

These new Cohrlastic fabrics withstand extreme temperatures and still retain their resiliency and flexibility. This is important for aircraft engine gaskets, washers, and diaphragms. These fabrics also possess high dielectric strength and resist hot oil, ozone and most chemicals.

Cohrlastic fabrics come in rolls 36" wide and various thicknesses. They are easily cut with shears and shaped for expansion joints and ducting. Finished gaskets and diaphragms, flat or convoluted may be ordered direct from the factory.

2007 3010 3016 3032

Temperature resistant Fiberglas coated with silicone rubber for operations ranging from —70 to +500°F.

THICKNESSES: .007, .010, .016, .032 inches.

Ideal for diaphragms, gaskets, seals, ducting, electrical insulation.

3510 3517

Orlon, the new, tough, industrial fabric coated with silicone rubber for temperatures from —70 to +300°F. Excellent thermal stability and superior flexlife.

THICKNESSES: .010 and .017 inches.

Recommended for diaphragms, bellows-type seals, etc.

Write for free samples and data sheets, stating your problem.

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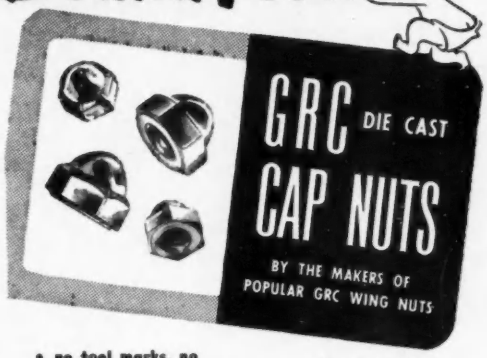
Connecticut
HARD RUBBER COMPANY

Contractors to the U. S. Government

420 EAST STREET, NEW HAVEN, CONN.

Brand New!



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Class 2 threads tapped square with face of nut. All commercial finishes in popular thread sizes. SUBSTANTIAL SAVINGS! Specials to order.

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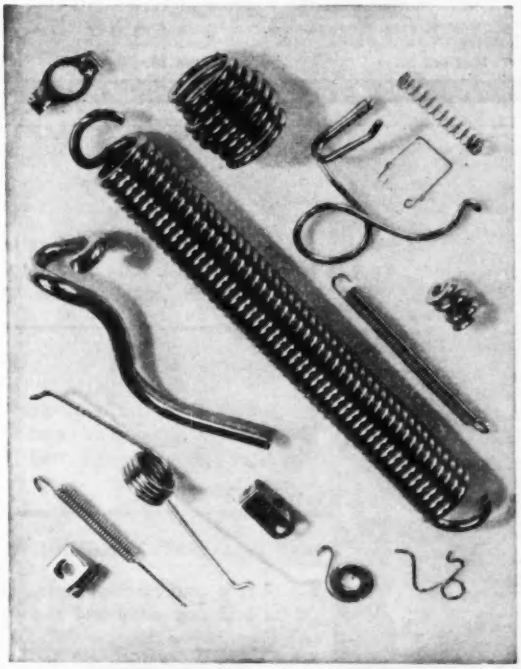
Producing Clutch Pressure Springs . . . Clutch Dampener Plate Springs



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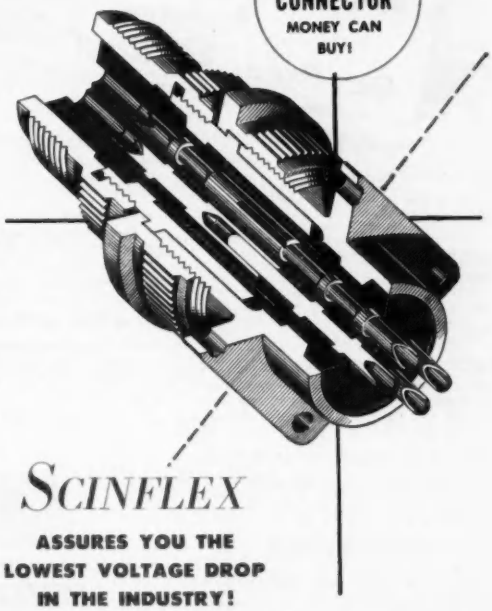
The Finest **ELECTRICAL CONNECTOR MONEY CAN BUY!**



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ASSURES YOU THE LOWEST VOLTAGE DROP IN THE INDUSTRY!

When operating conditions demand an electrical connector that will stand up under the most rugged requirements, always choose Bendix Scinflex Electrical Connectors. The insert material, an exclusive Bendix development, is one of our contributions to the electrical connector industry. The dielectric strength remains well above requirements within the temperature range of −67°F to +275°F. It makes possible a design increasing resistance to flashover and creepage. It withstands maximum conditions of current and voltage without breakdown. But that is only part of the story. It's also the reason why they are vibration-proof and moisture-proof. So, naturally, it pays to specify Bendix Scinflex Connectors and get this extra protection. Our sales department will be glad to furnish complete information on request.

• Moisture-Proof • Radio Quiet • Single Piece Inserts • Vibration-Proof • Light Weight • High Insulation Resistance • High Resistance to Fuels and Oils • Fungus Resistant • Easy Assembly and Disassembly • Fewer Parts than any other Connector • No additional solder required.

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From an electrical manufacturer:

"Products that required 60 minutes to bake with our previous equipment . . . now go through the oven in 20 minutes."

From a spring manufacturer:

"We are getting a very fine bake in one half the time as our present conventional type ovens and, of course, it is much quicker to bring up to the desired temperature thereby saving gas and maintenance."

From an air-conditioner manufacturer:

"We are operating this cleaning and painting operation through a Burdett gas fire burn-off and bake oven at about one-half our previous cost."

A large manufacturer of diesel engines found:

. . . that core drying formerly requiring 12 hours is now being done in only 12 minutes with much better results.

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Burdett "Radiant Heat"—the heart of every Burdett Oven—achieves these remarkable results in drying paints, enamels and lacquers, flash coat drying, burn-off and rust inhibiting, de-greasing, water dry-off, core baking, soft metal melting and food processing, because it features:

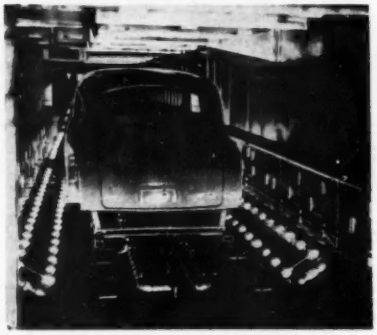
- **Instant Heat Transfer**
- **Deep, Thorough Heat Penetration**
- **Fast Start Operation**
- **Virtual Elimination of Fuel Waste—combustion is clean and complete**

Regardless of Your Operation

you owe it to yourself and your trade to ask for Burdett Oven recommendations. There's no obligation until you sign on the dotted line — and sign you will when you learn all the facts of how little it costs, how fast it performs, and how perfect the results.

Test runs—on your product—will be made for you at the Burdett plant without obligation. See it run—see the savings—see the results.

Burdett "Radiant Heat" Gas Burners can easily be installed in present equipment with revolutionary results and savings—ask about it!



Burdett System at leading Motor Car Builder cut drying time on synthetic enamels from 45 minutes at 300°F. to 19 minutes with 8% savings in fuel costs.

BURDETT
MANUFACTURING COMPANY
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OVENS AND "RADIANT HEAT" GAS BURNERS

ALL THREE ARE YOURS when you use METAL EDGE the Engineered Method

for packaging

. . . A space-saving procedure for assembling flats, as needed, into attractive, sturdy boxes.

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. . . A system for fast, accurate identification, inspection and inventory in storerooms and warehouses.

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. . . A safe and efficient method for handling parts and materials on production lines and in factory stores.

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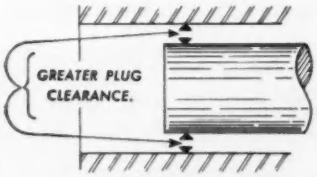
LET'S GET IT STRAIGHT!

The "DIMENSIONAIR" Air Gage —

EACH GRADUATION IS .00005"
AND NO DOUBT ABOUT IT.

LONGER PLUG WEAR
because of greater JET clearance.



IS calibrated accurately over its entire range

IS set accurately with only *one* master

HAS a range of .003" with 2500 to 1 magnification

HAS much longer plug wear

HAS greater plug clearance so that the same plug can be used on *both* rough and finished dimension

REMAINS *stable* for long periods of time

YES, LET'S GET IT STRAIGHT, the Dimensionair uses its own operating principle and new mechanical devices which do away with the limitations common to previous types of air gages.

ACTUAL SIZE: 9" x 7⅜" x 8½"
WEIGHT 17¾ LBS.

FEDERAL DIMENSIONAIR PROVES ITSELF

Why not find out to your own satisfaction what the Federal Dimensionair will do for you! Put it to work—discover how the exceptional measuring range of .003" lets you gage irregular shaped and tapered holes. Oil or coolants won't affect the Dimensionair: grit and dirt won't clog it: rough handling won't harm it.

Find out how the Dimensionair can do all this and more—ask our nearest representative to show you the Federal way to better, more positive air gaging, or write to us for complete information and prices.

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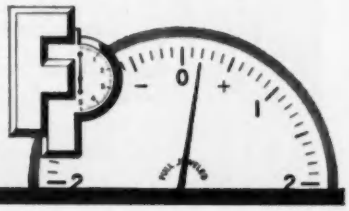
1262 Eddy Street, Providence 1, Rhode Island

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing *all types* of DIMENSIONAL INDICATING GAGES



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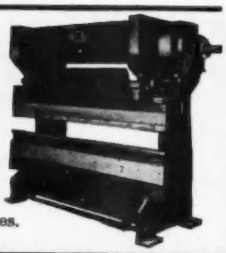
43 Standard Sizes

DIES Punching and Forming for All Makes and Sizes of Press Brakes.



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MOLINE "Hole-Hog"
SPECIALLY DESIGNED
MACHINE TOOLS
HAVE CUT PRODUCTION COSTS
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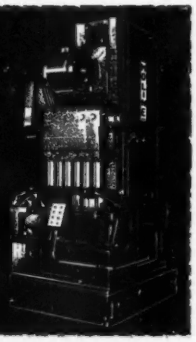

MOLINE TOOL CO.
"HOLE-HOG"
MOLINE, ILLINOIS

DRILLING
BORING
HONING
TAPPING and
Special Machines

TO CHECK SPEEDS PERIODICALLY
TO SHOW SPEEDS CONTINUOUSLY
USE JONES TACHOMETERS
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RAILS New and Relaying!
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Switch Material • Spikes and Bolts • Track Tools • Ties • Tie Plates • Bumpers • Complete Side Tracks
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★ *SAFE*
★ *EASY*

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OVER-TANG
Vertical Handle for Surfacing

For 12" to 16" Files
Sizes as Above Weight 6 Ounces

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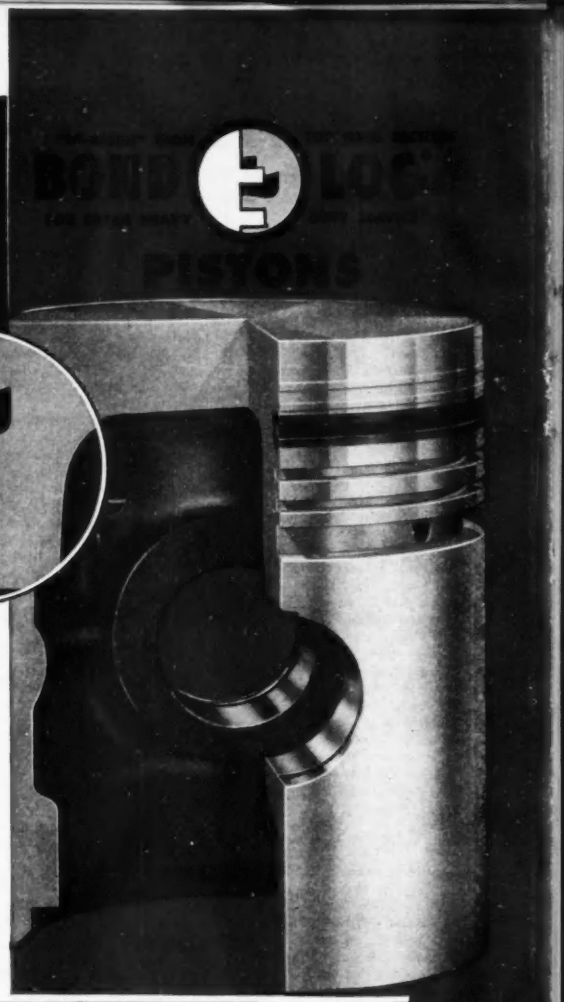

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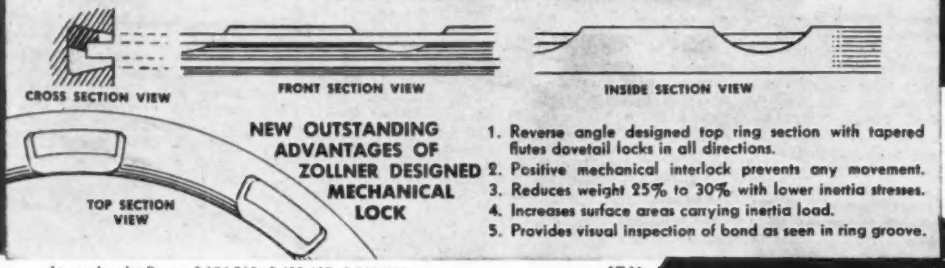

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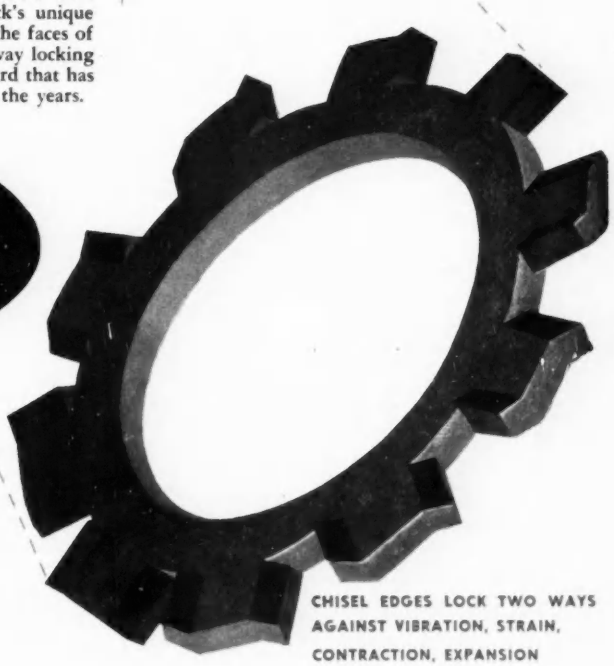

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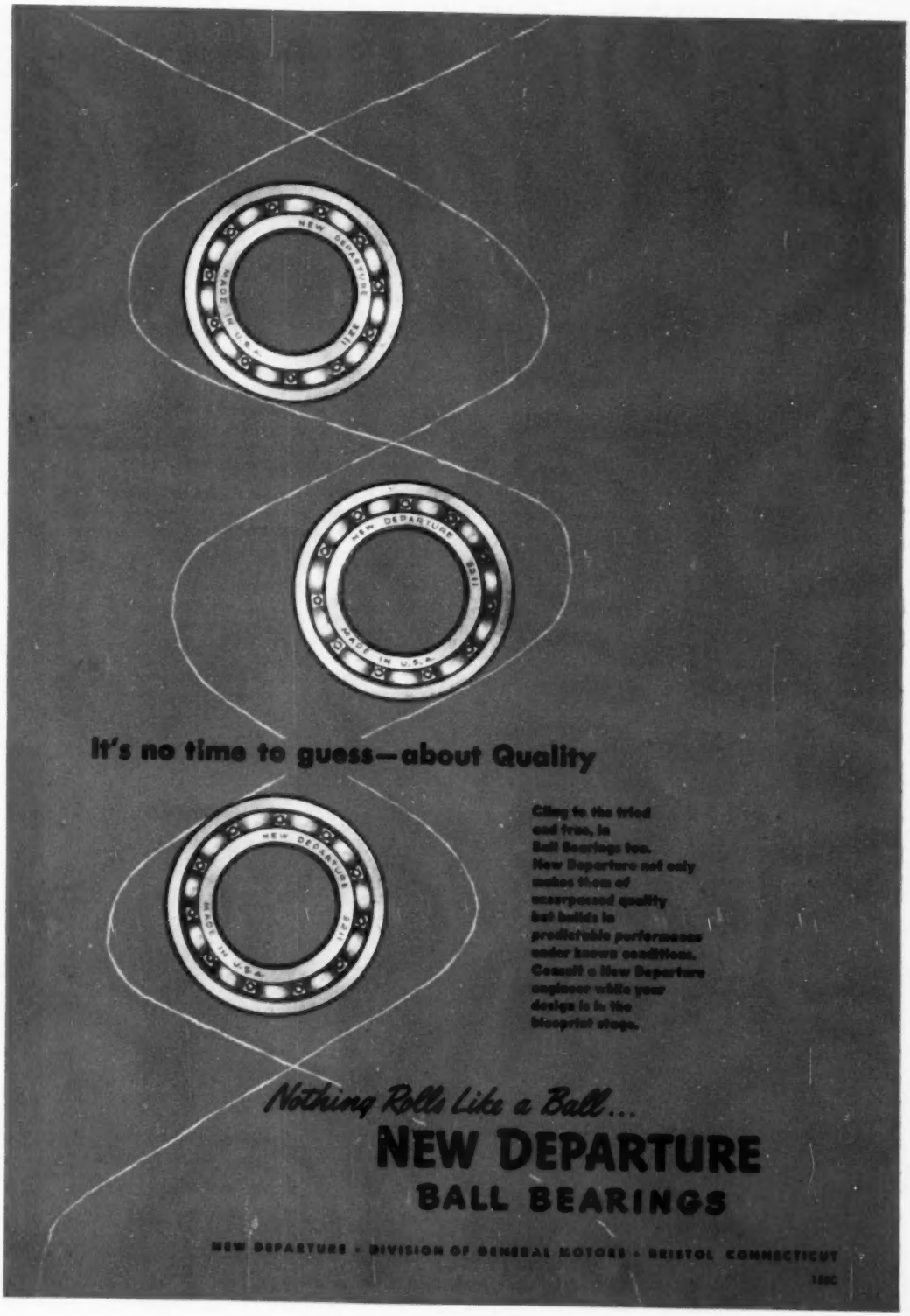
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